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JANUARY/FEBRUARY 1980

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The Bahamas • Crystal River, Florida • Mauritius

Lloyd Bridges Interview

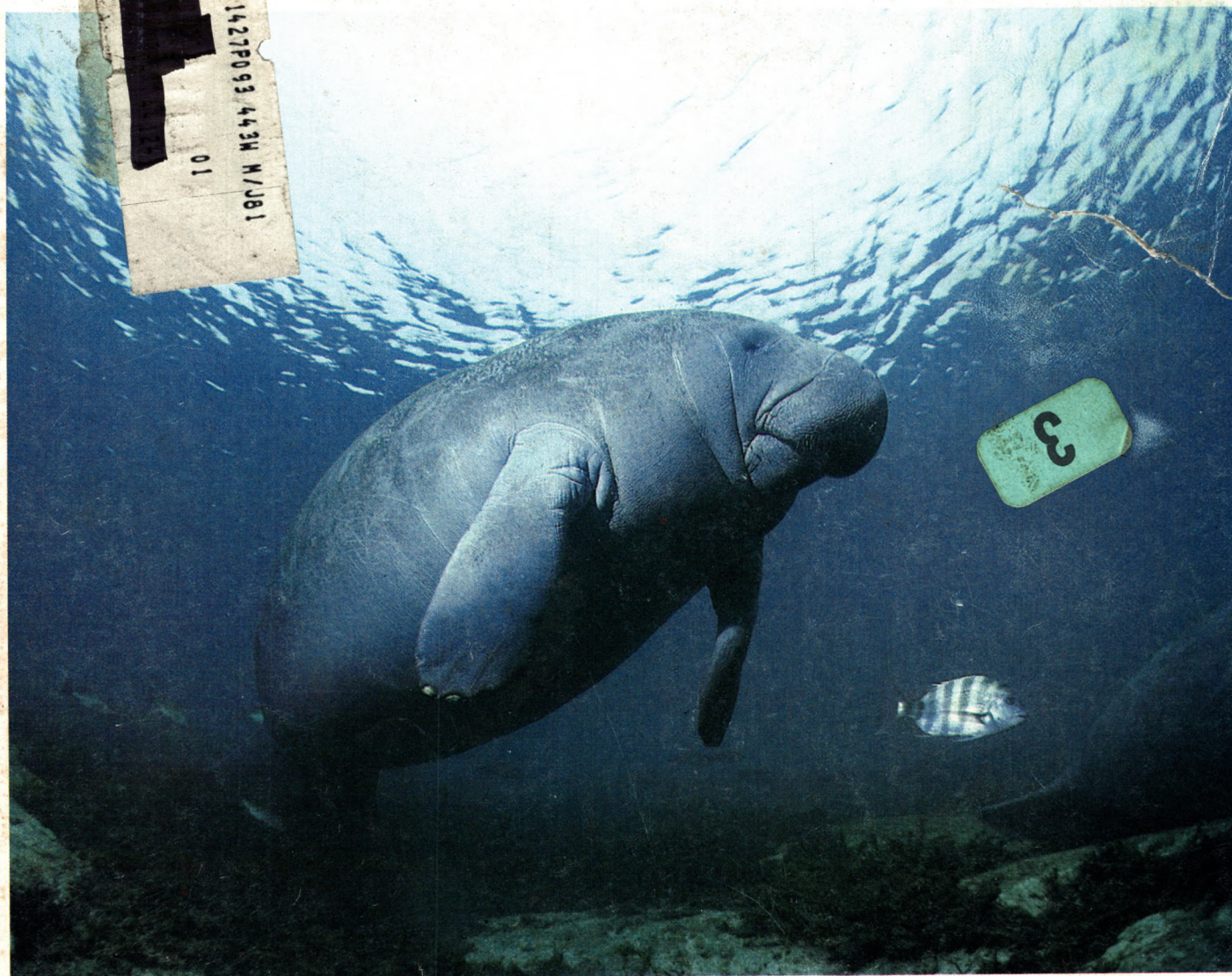
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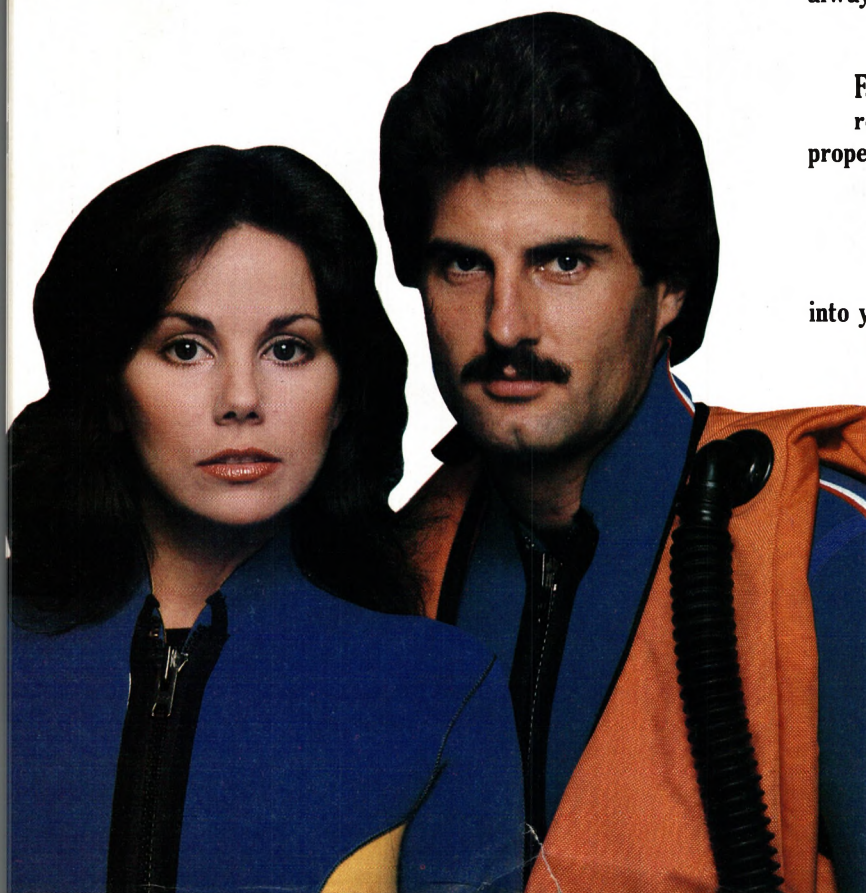


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DESTINATIONS



FRED BAVENDAM

The Bahamas 50
by Phil Trupp
The Bahamas are back! In the Second Complete Bahamas Resort Guide, *Sport Diver* takes a 26-page macro-view of the most popular diving destination.

Crystal River 142
by Steve Blount
Crystal River's manatees are the focus of a raging controversy. Boaters and divers square off against the federal government over how best to protect the endangered mammals.

Cover: A manatee, *Tricheus manatus*, in Florida's Crystal River by Fred Bavendam.

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Inside Sport Diver

The bottom line: more and better.

It's our birthday. This issue marks the first anniversary of our new expanded format as *Sport Diver* enters its fourth year of publication. Like most four-year-olds *Sport Diver* is growing fast; during 1979 we added more pages, became available in more places and were picked up by more readers. We were happy and the readers were happy, except, they said, getting *Sport Diver* is like getting birthday presents; it doesn't happen often enough. So, as the sport of scuba approaches its fourth decade, we decided to give everybody a present: *Sport Diver* will be published six times this year. A new issue will be released every two months. Each will deliver the same succinct writing, crisp graphics and high-voltage photography you expect; only more, and we hope, better. More travel destinations, more state-of-the-art technology, essential instruction and more informed opinion from the sport's leaders and pioneers. You'll hear from Richard Ellis on diving with whales in Patagonia; the *Sport Diver* staff on a saturation mission in the Hydro-Lab; Carl Roessler on how to buy a dive vacation; and about dolphins who dig Ravi Shankar and Yehudi Menuhin.

While we're doing more for the magazine, we're doing more for the scuba industry too. At the Dive Equipment Manufacturer's Association gathering in New Orleans this month, a new publication will be released: *Sport Diver's 1980 Buyer's Guide* for the trade. The *Buyer's Guide* is a comprehensive single-source reference to all recreational and commercial diving equipment available on the U.S. market and to travel resorts all over the world. Initially circulation will be limited to professional dive stores — you can't buy a copy. But the information in the *Buyer's Guide* will be included in the summer issues of *Sport Diver*.

The 1980s will be a divers' decade. As the search for fossil fuel and other economic imperatives push our country into the ocean, it is our responsibility to serve as expert witnesses in the court of public opinion. We must protect our recreational preserve from pillage while nurturing technology and attitudes that may ultimately lead to responsible use of ocean resources. A basic student with one open-water check-out has more direct knowledge of the ocean than a caucus room full of dry-land congressmen. It is time to vocalize and use this knowledge in a positive way. *Sport Diver* will continue to bring you the information you need to exercise your influence, such as the report of Dr. Lowell P. Thomas on the world's biggest oil spill (page 95) which may have crippled the Gulf of Mexico.

It is the hope of preventing tragedies like this that gives us the enthusiasm to send *Sport Diver* to you six times this year. We hope you'll read it and use it wisely.



EMILIO RODRIGUEZ JR.

Steve Blount

Steve Blount, Editor

A black and orange Scubamaster snorkel is positioned diagonally across the frame. A clear silicone diving mask with a wide-angle lens is attached to the snorkel. The mask's interior shows a white silicone skirt and a clear breathing tube. The background is a deep blue gradient.

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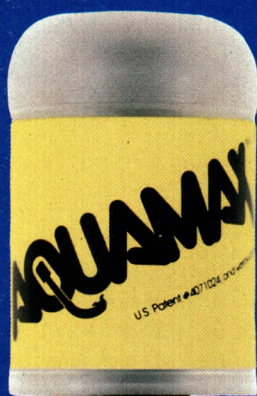
Ask your local dive shop about his special combination price on Scubamaster's #1273 mask and #1442 snorkel. It's all part of the Buddy System, a program dedicated to offering you advanced design and quality products at affordable prices. So see your participating Scubamaster dealer soon. He's the best buddy you've got.

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The Mail

Abalone Steak Breakdown

I was happy to see the article on abalone, "The Edible Sea: Shellfish Steak." (Fall 1979). However, I take exception to the described practice of pounding the abalone with the sharp-edged side of the ab hammer. Abalone meat is tough, to be sure, but it is also extremely delicate. Ideally, one should break down the muscle tissue without tearing the meat. A flat-sided hammer is preferable and a drawing or pulling motion should be used to uniformly tenderize the steak. The technique you describe yields both tough and tender areas. For as all abalone gourmets know, if a knife is needed for the final product, the cook bungled the job.

Kurt F. Schmitt, Co-author
Abalone - From Sea to Saucepan

How Little...

Lou Fead's article (Summer 1979) could just as easily be titled "Basic Instruction: How Little is Too Little?" Obviously there's another side to the coin, with as many arguments to support it.

As an instructor, I must agree with his basic premise that "overlearning can turn off students," but where do we draw the basic certification line? Should an individual taught and certified to the "quickie" resort course level be allowed to rent full gear to dive under ice, in high altitudes or in an area of poor visibility? That diver's C-card could be a ticket to a world of fun and enjoyment, or a one-way trip to a fatal experience.

We teach our students always to dive with a buddy, but not because we don't want them to get lonely. We teach them that, for that one in a hundred dive accident or one in twenty dive difficulty, a little more knowledge is often a lifesaver. I've often had second thoughts about the value of knowing "Dalton's what?" or "Charles' whatever," but where do we draw the line?

Grant Leggett
Saskatchewan, Canada

I must respond to Jim Ryan's letter (Fall 1979) taking Lou Fead to task for his recommendations to simplify diving instruction. I agree with Lou that a good

deal of time is wasted covering material non-essential to the sport diver's recreational and safety needs.

Students dive for fun, adventure and recreation. In a highly competitive market, we must produce methods of instruction consistent with these goals. People dropout because they spend their time being fed an abundance of useless information. We must emphasize the positive aspects, the fun part of our sport. Let's keep the students' needs in mind, not to the detriment of safe diving, but with the idea of teaching a practical course.

Bret C. Gilliam
President, V.I. Divers, Ltd.

Far-out Islands

Thanks for your beautiful pictorals on the out islands — really out. Dive spots like Palau, Turks and Caicos and Truk Lagoon are certainly intriguing and I dream of visiting them someday. But right now I don't have thousands or even hundreds to spend on world-wide travel. I just want a place to dive, closer to home where I won't lose my shirt. Any ideas?

Frank Deemer
Macon, GA

Hold on to your shirt and turn to page 50 for our complete guide to the Bahamas. Just what you had in mind - Ed.

Kelp in Bloom

In your article "Ocean Thermal Energy" (Fall 1979), the point is raised that pumping colder water from the depths and releasing it at the surface may have an effect on the environment, such as "blooms of photoplankton." I have read in other publications that work has been done on the idea of pumping the nutrient-rich water from below and circulating it past kelp attached to submerged supports to enhance its growth. The kelp can then be harvested and converted into fuel and fertilizer. Is it possible to combine these two operations to eliminate a possible environmental hazard and create a useful by-product?

Bill Moore
Mobile, AL

Yes, but it's not likely to happen soon. Re-

search studying the feasibility of enhancing the growth rate of giant kelp, Macrocyctis pyrifera, has been carried out by the California Institute of Technology under contract to General Electric for the past three years. Under laboratory conditions, juvenile kelp has been induced to increase its growth rate from about six percent per day to more than 30 percent per day through exposure to an upwelling of deep, nutrient-rich water. Though scientists have discussed the idea of coupling this research with OTEC hardware, which could easily provide the quantities of deep water required, they say much more field research is needed before OTEC can have a try at growing kelp - Ed.

Innerspace Space Cadet

Congratulations! Your Fall 1979 issue was the best to date. "Portfolio: Innerspace" especially blew me away! Where do you find those extraordinary photos? It's hard to tell if they're from outer or inner space. I just wanted it to go on and on and on.

Susan Andrews
Oklahoma City, OK

Treasure Diver's Lament

You took the liberty of quoting my letter to Mr. McKinney in "Letter from Washington" (Fall 1979) and I'd like a chance to respond.

I personally have nothing against Mr. McKinney other than that he works for the biggest employer in the U.S.A. — the government. I personally would not threaten his life — he's not worth it.

But I will try to keep him and his department out of diving as he is a part of a monster whose tentacles will strangle the life blood out of diving unless he meets resistance from the diving community, whether it be the average sport diver or the treasure diver.

Do not be misled by the promise of mutual cooperation between Uncle Sam and treasure divers. The divers are probably more qualified and "artifact-wise" than most diving archaeologists if only because the huge investment forces them to know what they are doing. Any forced cooperation or legislation will only lead to miles of red tape and di-

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minishing interest by private investors. This can lead to two results: the treasure will stay undiscovered and be dissolved into the ocean or the government will become the treasure hunter and investor because it will be the only one that can afford to do so.

I say keep government interference to a passive role. I would rather see the government require the treasure hunter to qualify for some basic archaeological certification than have the government directly involved.

J.P. Robinson
Clifton, NJ

What a pleasure to read your sympathetic article on the private treasure salvor vs. public heritage controversy and one of its leading activists, Charles McKinney.

There are difficult decisions prevalent in this pressing problem's solution but I believe the positions advocated by the archaeological profession, in particular the Office of Archaeology and Historic Preservation of the Heritage Conservation and Recreation Service, represent the best interests of American citizens.

Lobbyists for the treasure salvors, who are unwilling to share the historical and prehistorical values of underwater sites frequently distort that fact. Conversely, archaeologists and other cultural resource managers are ignorant of, or unwilling to think through the economics and distribution of resources that are wealthy beyond heritage.

Many of us on both sides of the issue are not comfortable with the prevailing legislation yet I expect a consensus of all parties within a decade.

Bruce E. Rippeteau, Ph.D.
State Archaeologist, CO

I read with great interest your recent column on historic shipwreck legislation. Overall I liked it, but I must take exception to the statements concerning the Atocha case.

The statements about "the Atocha being destroyed by the salvors' dredge and history sacrificed to an air lift," for instance. A dredge destroys artifacts — Treasure Salvors doesn't use dredges. The company takes great pains to recover every item intact. In fact, since 1973, we have had at least one full-time archaeologist on our staff to supervise excavations.

Years ago when Mel Fisher moved to Florida, he realized the historical

value of shipwreck sites and invited the most prestigious archaeologists in Florida to visit the sites and advise him on how history's interest might best be served. In most cases these individuals showed no interest. It seems they didn't want to taint their reputations by working with a treasure hunter. To date, our staff archaeologist, Duncan Mathewson and our Spanish-American historian, Eugene Lyon, have given many scientific papers concerning work on the wreck site.

You see, there are many people with a burning interest in history, including treasure hunters. McKinney doesn't have to worry about the professionals; we realize the value of archaeological information. Mel Fisher has a standing invitation to anyone seriously interested in archaeology or study of Spanish Colonial materials, federal or state archaeologists included — we have a 1622 wreck site and are willing to share.

The ones that frighten me are the amateurs, the weekenders, who put things on their mantle or in a bank where it disappears forever.

Essentially, I believe what we have on our hands is a re-education problem. Few responsible individuals would destroy a historically valuable item or deface the past — at least not on purpose. Few people truly understand the complex destruction of a wreck site.

The sport diver has a significant role to play in the future of shipwreck archaeology. But he has to have direction, he has to be molded and educated.

Don Kincaid,
Photo Consultant,
Treasure Salvors, Inc.

Aloha, Hawaii

I knew sooner or later *Sport Diver* would come to realize what I've known for years: Hawaiian diving is the best, and so was your piece on our beautiful state.

Joel Hensen
Honolulu, HI

Paradise Diver's Lost

Please tell me where I can buy a copy of "Diver's Guide to the Truk Lagoon" by Philip Rosenberg and Clark Graham featured in your Summer 1979 issue. I've scoured the dive shops in this area, but no luck so far.

Capt. P.S. Edwards
Seattle, WA

For a copy, send \$6 to: Micronesia Aquatics Dive Shop, P.O. Box 57, Moen, Truk Lagoon, ECI 96942-Ed.

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Richard Ellis

Of whale bones and the humming humpback.

When I was asked to write this column, I was told I could write about anything I liked. Readers who have followed my new career as a columnist will have noticed I have not once written about diving. I am conscious of my oversight and, therefore, I intend to discuss some diving I did recently. It was fascinating, and most of it took place in water less than six feet deep.

Before I take this death-defying plunge, though, let me set the scene. In June 1979 I traveled to Newfoundland to participate in an Ocean Contact expedition. Founded to encourage interaction between cetaceans and humans, Ocean Contact is the brainchild of Peter C. Beamish, PhD, a Canadian biologist and acoustician who left government employment, tenure, a good salary and three secretaries in 1978. He invites groups of ten to 12 people to his delightful lodge at Trinity Bay to spend a week looking at whales and being looked at by them. I brought my wife and two children (ages 11 and 9), and it proved to be one of the most exciting and enjoyable trips we had ever taken together. We experienced the incredibly beautiful Newfoundland landscape, ate extremely well and saw bald eagles—11 at one time—icebergs, kittiwakes, murre, shearwaters, gannets, puffins and numerous whales, most of them minke and humpbacks.

We were aboard the *Sea Clipper*, a 42-foot wooden sloop chartered by Ocean Contact. At 11 a.m. on June 21, we sighted the blows of two humpback whales far in the distance. When we were within 200 yards, we launched an inflatable Zodiac with Beamish and one of Ocean Contact's whale guides aboard.

Beamish is an accomplished musician and often entertains at the piano after dinner, but this time he was equip-

ped with an instrument somewhat more manageable in a rubber boat: an accordion. He neared the whales, playing loudly, and they stopped swimming.

It is tempting to write that they stopped to listen, but that would be unscientific. We don't really know why they stopped, but we all saw them stop while Beamish played. He continued for three or four minutes. When he stopped, the whales dived under the sloop.

Humpbacks, of course, are the singing whales, responsible for at least



two commercial phonograph records, and their auditory responses must be highly developed as well. We could see them from the *Sea Clipper*, hovering about 20 yards away, their backs awash and long white flippers glinting green through the water.

Newfoundland in years past was the hub of important whaling enterprises, including a pilot whale fishery. Pilot whales, *Globicephala melaena*, are 20-foot black whales with a high-domed forehead known as the melon. Oil contained in this melon was extremely valuable as a lubricating agent for fine machinery, and the whales were driven into shallow water to be killed by men waiting on the beaches. We visited a beach carpeted with pilot whale bones, perhaps the scene of some of these mass killings.

Only five of us had chosen to visit the bone beach that day; the others were off looking for humpbacks. From a distance, the beach looked as if it had been snowed upon. The whiteness of the bones made a startling contrast to the cold, dark water. Thousands of bones of

all sizes littered the beach, from the massive rounded skulls and wedge-shaped lower jaws to gracefully curved ribs and three-winged vertebrae. In shallow water near the beach, we saw bones under the water, glowing ghostly green.

After pulling the boat ashore over the bones, we patrolled the beach. From shore we could see some large white objects submerged about 20 feet from the beach. They were much too big to have come from a pilot whale, so an underwater investigation was obviously necessary. I donned a full-coverage three-eighths wetsuit, hood, mask, gloves and boots and entered the 45-degree water. I eased myself slowly over the bones. As far as I could see in all directions, the floor of this secluded bay was a tangled underbrush of skulls, ribs and jaws. It was an eerie and sobering experience.

I have long been active in various save the whales campaigns, but this was the first time I had seen first-hand the results of the whale killers' depredations. Thousands of whales had died here to provide lubricating oil for the machines of men.

I swam to the large white bones. There was no question about their identification: they were the lower jaws of a sperm whale, the right and left mandibles that come together to form the long, narrow jaw of the greatest of the toothed whales. But where was the rest of the skull? The upper jaw and brain case of the sperm whale is one of the largest bones in the world—it can be 20 feet long and weigh several tons. I could not find it in the water, so I swam ashore.

We had packed a lunch, and the others had grown hungry as I swam back and forth over the whale bones. Since much of the beach was covered with the osteological remains of pilot whales, they had chosen to sit and eat lunch on what looked like an enormous piece of sun-bleached driftwood half buried in the sand. When I joined them, I looked again. It was the massive skull of the great sperm whale.

Richard Ellis is a writer and illustrator whose world is natural history. His illustrations have appeared in many publications including Audubon and the Encyclopedia Britannica. Ellis is also author of The Book of Sharks.



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Lowell Weicker

Strip mining the oceans: Approach with caution.

More than 16,000 feet beneath the Pacific Ocean, one of the world's great treasures lies on the bottom sediment. An imminent onslaught of deep sea mining ships will soon seek this wealth — potato-shaped nodules containing strategically important metals including cobalt, nickel, copper and manganese.

Manganese nodules, first discovered by the HMS *Challenger* in 1873, literally cover the floor of the Pacific Ocean and some parts of other oceans, with perhaps as much as 100,000 tons per square mile in some areas.

No one really knows how or how long it takes for these nodules to form. Apparently, the materials in the nodules precipitate from sea water and form around a solid object such as a shark's tooth, volcanic ash or bone, and probably take millions of years to form.

It has been estimated that the U.S. could become almost independent of the need to import these four critical metals by 1990. Presently, we import 98 percent of the manganese we use, 98 percent of the cobalt, 15 percent of the copper and 71 percent of the nickel, at an annual trade deficit of over two billion dollars.

U.S.-based industry and international consortiums are now developing technology to mine the nodules. Even though they lie on the surface of the sediment, the problems of working in such deep water are difficult to overcome and extremely costly.

Because the nodules are found in international waters and are considered the "common heritage of mankind," deep seabed mining has become a heated political issue in the United Nations Law of the Sea negotiations. Less developed nations want to form a comprehensive authority to control mining on the high seas. This authority would have access to technology developed by any nation or industry and would share

in the profits of any mining operation. The authority would be controlled by a one-nation/one-vote system clearly in favor of the less developed nations which normally vote *en bloc*.

It is understandable why U.S. companies, which presently hold the most advanced deep seabed mining technology, are concerned about the outcome of the Law of the Sea negotiations and resultant treaty. The concept of such an authority, which could take away a company's technological advantage, con-

*Destroying deep
sea life could indirectly
affect organisms
in other areas such as
tropical seas.*

flicts with our free enterprise system.

While the battle goes on in the United Nations, Congress is pushing through an interim bill that would allow U.S. industries to unilaterally begin deep seabed mining. The bill would be in effect only until a Law of the Sea treaty is ratified by the U.S. It would, among other things, provide a policy for deep ocean mining setting up guidelines for the industry to follow. In addition, a "grandfather clause" would protect U.S. industry investments made prior to the treaty ratification. Environmental regulation is an integral part of the bill, intended to start the industry on a sound environmental footing.

Although I am a supporter of deep seabed mining, particularly if it makes us self-sufficient in these critical metals (OPEC's stranglehold on our economy through oil sales is a lesson we should learn from), the potential environmental damage to the deep ocean concerns me.

Apparently the fauna of the deep ocean is extremely fragile, much more so than that of shallower areas. No sunlight penetrates the great depths in which the nodules are found, and the water temp-

erature remains constant year-round at about 35 degrees, with the pressure at 16,000 feet exceeding 2200 pounds per square inch.

Some scientists believe that many species of marine life living on the deep bottom take as long as 50 years to mature and reproduce themselves. Growth and metabolism at these great depths are slow. It is possible that an area of the deep ocean bottom could take 50 to 100 years to fully repopulate.

Some samples have shown that the general population on the deep seabed amounts to 5000 individual organisms per square yard. In one experiment, all of the organisms in a square yard of the deep seabed sediment were removed and the area examined two years later. Only 500 organisms were found at that time, and all were juveniles.

This experiment indicates that the repopulation process is extremely slow in deep water and the growth rate of the organisms equally slow.

Strictly from a preservationist or academic standpoint, the results of these limited studies are disturbing. It is possible that when deep seabed mining is at its peak with many large ships raking, dragging and cleaning the bottom sediment of not only nodules but marine life as well, large areas of the earth's last remaining pristine environment will be stripped of significant living populations for a long time.

As a practical matter, the destruction of deep sea organisms and perhaps whole ecosystems could have a profound effect on other systems closely related to human needs. Deep sea life is like all other life forms in terms of interrelationships between life forms. What happens in the deep sea, for instance, could sooner or later indirectly affect a shallow tropical sea.

The point is we just don't know what the effects of mining nodules from the deep ocean will be. We are presently very much in the dark concerning the deep seabed. We know as little about the deep oceans now as we did about the

continued

Senator Lowell Weicker (R-Conn.) is a concerned diver who has spent time in the Hydro-Lab. He is a member of the Marine Resources Committee of the U.S. Senate.

A full-page photograph of a male diver in a red wetsuit, black mask, and snorkel. He is holding a Nikonos III camera in his right hand and is positioned near a boat's ladder. The background is a clear blue sky.

This is the camera that's designed to make underwater photography as uncomplicated and successful as you want it to be. The only fine "35" that can go down to depths of 160 feet without a housing. So you don't waste time fitting pieces together and double-checking that everything is tight. You simply grab your Nikonos III and jump in. And, if you see a great picture topside or ashore, the camera is ready for it as quickly as you are—again with no special preparation and no needless bulk.

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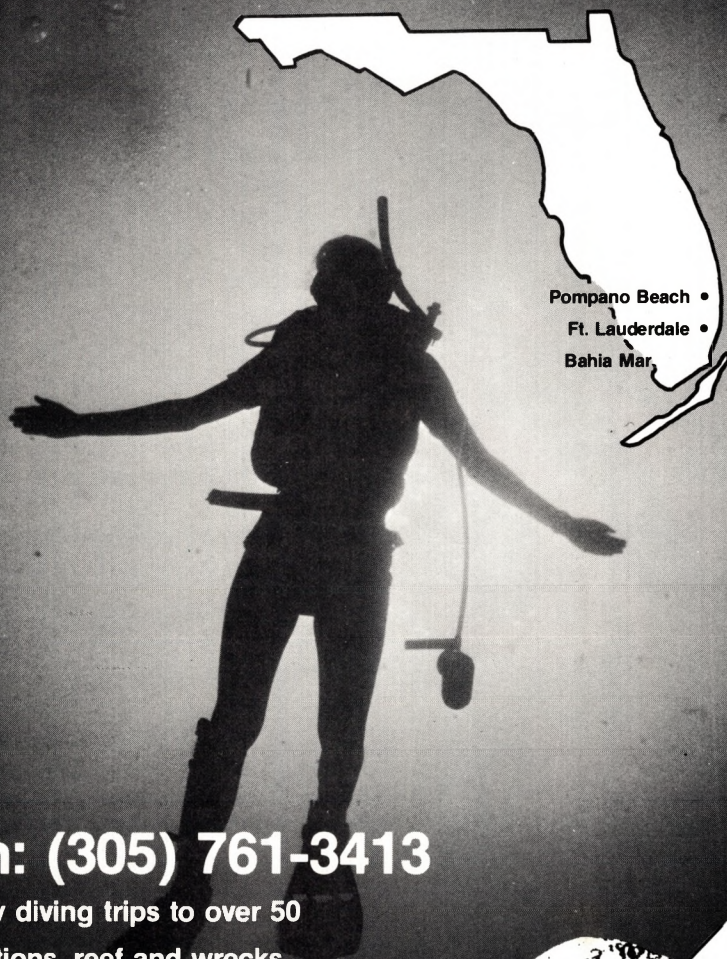
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Gary Hytha

WEICKER *continued*

dark side of the moon in 1960 — many of our assumptions are based on speculation and conjecture. Very little study has been conducted on the bottom because of limited funding and the general difficulty of working at such depths. Certainly these difficulties are no more insurmountable than those presented by a program to move three air-breathing, warm-blooded humans 250,000 miles through the cold vacuum of space to a landing on the moon.

It is my hope that, before deep sea-

*The mining of
vital minerals from the
seabed will be
an important industry in
the next decade.*

bed mining starts in earnest, we launch a solid program of study to gain the knowledge we need to reap the benefits of the deep sea and at the same time conserve its varied and unique ecology.

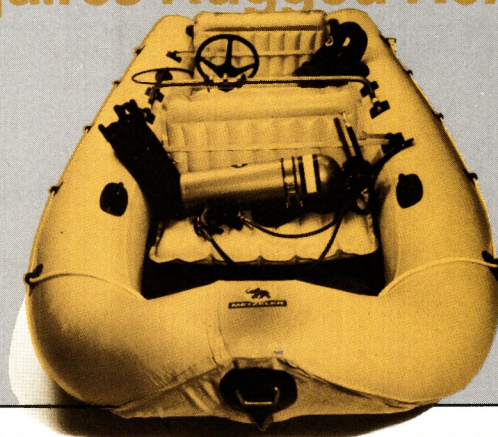
The process of accumulating masses of data, which has been the extent of much of our study of the oceans in the past, is not enough. We must use this data to improve our understanding of the varied and complicated processes that occur in the deep ocean. As deep seabed mining proceeds, so should our understanding of the deep oceans advance. Scientists should be an integral part of a mining ship, collecting and studying a great number of previously unknown animals that will surely be a part of the catch along with the nodules.

Deep seabed mining will become an important industry to this nation and others in the next decade. The United States will most likely be the first nation to start commercial harvesting of deep nodules and production of useful minerals from them.

I believe it is important that we become first, so that we not only start toward self-sufficiency in manganese, nickel, cobalt and copper, but can set the model for an intelligent conservation program for other nations to follow.

We have a great opportunity for the first time in our history to start a sound environmental program before a new industry begins. The consequences of ignoring this challenge are frightening to contemplate.

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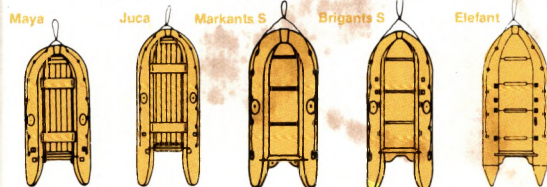
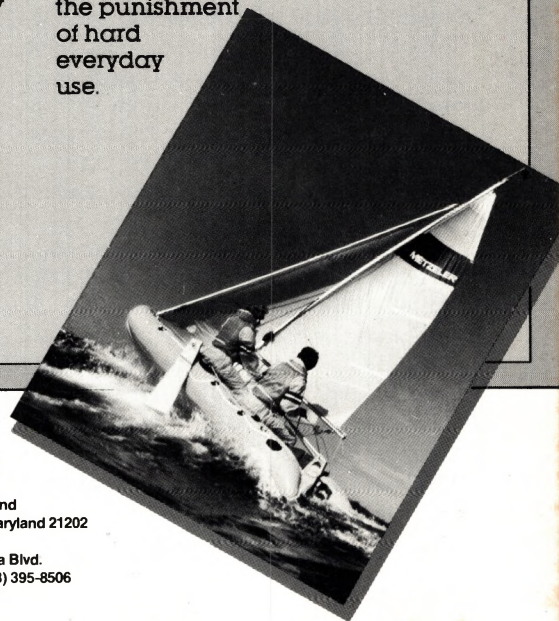
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Versatility. Metzeler inflatables are easy to assemble, can be launched virtually anywhere, require little maintenance, can be carried in the trunk of a car, and may be used for a variety of purposes. They are ideal for sailing, water skiing, fishing, family outings, or as dinghies, tenders, or general transport boats.

Safety. From the bright orange hull to the specially laminated fabric. Metzeler boats are designed with safety in mind. All models have at least three air chambers and will operate with one chamber fully de-

flated. Although virtually impossible to swamp, Metzeler boats will carry a capacity load even when full of water. Their special construction makes them highly abrasion resistant and difficult to puncture.

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Tim Cahill

Diamond diving and piranha dodging.

"They come like locusts after a big strike," Barry said. He is a rangy Australian in his middle years, sporting a David Niven moustache. We were drinking Polar beers in the Fronterras Hotel bar in the jungle town of Santa Elena, down in the southeastern corner of Venezuela near the northwestern borders of Brazil and now-infamous Guyana.

Barry dives for diamonds in various remote South American rivers and he was telling me a little about the dangers of his occupation. Competitors, for instance, rankled him.

"They don't prospect. They just sit up there in Ciudad Bolivar. Hire Indians to track you. When they hear about a strike, they come paddling up the rivers or crawling through the jungle. Men get shot trying to hold a claim. You have to be able to shoot straight in this business. Yes, and keep your mouth shut when you hit the Big Strike. You can't get drunk and just blurt it all out in some bar. That's a real danger when you've been off in the bush a few months."

I asked Barry about the mechanics of diamond diving.

"I always use scuba gear," he said, "though in Brazil they tend to like copper helmets and here in Venezuela you see more compression rigs.

"Now what happens is that the diamonds are harder than other rock, and when that rock gets weathered, the diamonds break out free and shining. Have you been down to Icabaru? After the hard rains there you can see children looking for diamonds in the street. The rain just churns them right up out of the dirt.

"Me and my crew, we've always shot for the long odds, and you won't see us at the big camps. I like a strong running river that comes down out of one of these table mountains, like Kukunam or Roraima. The river busts up the rocks for you and gold nuggets and diamonds come rolling down and settle on the bot-

tom of the first big lagoon down river.

"Often as not it's a five- or ten-day walk to get to a place like that. We don't use mules to pack our gear. Grasses here are no good. You'd have to carry feed for them as well, you see. Sometimes you can get most of your gear to the site in a dugout. Trouble is, in the dry season you get hung up on the rocks and in the wet season you can just as likely turn over in the rapids.

"Of course there are fellows who free dive a lagoon with a pail. No mask,

*"When the river starts
to dry up it can leave isolated
holes — posos they're
called — and the piranhas in
them are hungry."*

you see. They come up with a load of gravel and put it through their diamond pans which are like gold pans with fine wire mesh in the bottom to eliminate sand and light gravel.

"Me and my crew, we need to carry my tank and a compressor and a pump and tubing and a lavadore and a generator. See, I pop down to the bottom — that's ten to 40 feet — and I have a big vacuum tube to pick up the gravel. The gravel is pumped into the lavadore, a big machine which separates the heavy stuff from the light stuff with water and vibration. Next day, we'll all sift through the heavy stuff with our diamond pans. We all work on a percentage basis.

"It seems that where there are diamonds, you often find gold as well. You can work for months and never see a diamond. Course, we have a cook and hunter with us, but if you're having a run of bad luck, likely as not, the hunter will run out of lead. I've been in several camps where we had to load the gun with the gold we'd found.

"Most animals out in the bush are tasty eating. I like monkeys and jaguar

and deer. Only thing I can't abide is anteater. Rancid-tasting meat on those ugly beasts.

"I've seen a lot of jaguars. Sometimes they come around the camp at night. They like to circle, just outside the light from the fire. You hear lots of stories about jaguars attacking people, but I've spent 20 years in the bush and I've never seen it happen.

"Anaconda is something you have to see to believe, a real nightmare of a snake. I've seen them 40 feet long and big around as a 50 gallon oil drum. They eat small deer, anacondas do. Get them when they come down to the river to drink. Can't swallow the antlers, though. Sometimes you see them sunning on a sandy bank, all swollen with a deer in their belly and antlers hanging out of their mouth. They just have to wait until most of the deer is digested then they spit out the antlers.

"Everyone asks me about piranhas. Well, they're just little fellows, like your sun perch. I've had 50 or 100 around me while I've been diving. You really don't have to worry about them when the river is running fast and there's plenty of feed. In the dry season, it's a different story. When the river starts to dry up, it can leave isolated holes — posos they're called — and the piranhas in them are hungry. They attack anything that moves. We like to kill a cayman, which is like a small alligator, and toss him in the poso. The piranha can strip him to the bone in a matter of minutes. But we just toss him in, then yank him back out on a chain. There'll be a hundred of those nasty beasts on him, snapping and flopping. Surprising how much pleasure we get out of watching them jerk around and die on the bank.

"Now where the big rivers like the Orinoco and the Rio Negro run slow, you have to expect piranha. Also electric eels, which are deadly as well. And orifice fish, little skinny fellows who swim up your anus or urethra and open up with spines so they have to be surgically removed. I don't like diving those

continued

Tim Cahill is a contributing editor of Rolling Stone and former associate editor of Outside.

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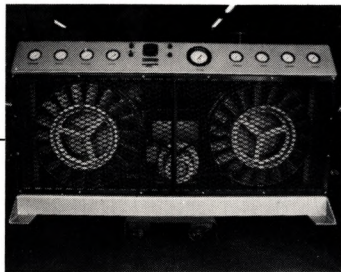
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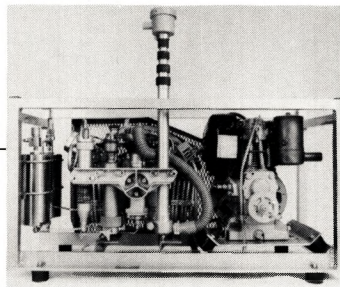
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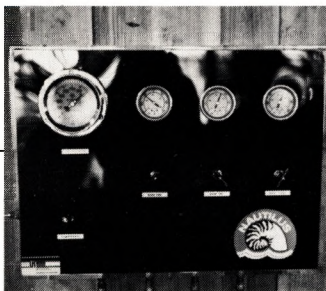
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CAHILL *continued*

rivers so much. It's better in rivers like the Churin or Caroni. These have their headwaters in the jungles where rain washes tannic acid out of fallen leaves and trees. The tannic acid turns these rivers the color of strong tea, and the deepest lagoons are silvery black. For some reason, there aren't a lot of fish in these colored rivers and you can swim safely in the black lagoons, though you need a strong light for diving."

It was about this time that the lights went out in Santa Elena. The town's generator operates from dark until midnight, but the Fronterras bar is equipped with candles to accommodate the serious drinkers, of whom there were several that night.

Barry reached into his pocket and came up with a leather pouch. He loosened the drawstrings, poured out several small diamonds and rolled them around in his palm. They glittered in the flickering candlelight.

"You're not worried about bandits?" I asked.

"No, this is a border town. There's army and national guard and local police. Very safe."

"How much are these worth?"

"Oh, about 60,000 *bolivars*."

"That's, uh, around \$15,000."

"A very small strike."

"Really?"

"You can dig up \$100,000 worth a day on a big strike."

We contemplated that over several more Polars. The room began to get a bit fuzzy at the edges. There were some wrist-wrestling matches and a young Brazilian who had become belligerent was pitched out into the street by several irate drinkers. The candles began burning like sparklers, or so it seemed, and they flickered into hot white pools at the bottom of their cups.

Barry and I lurched into the still night air. Unfamiliar stars burned in the sky, and because I was a lover of Polar beer and a man with a strong arm for wrist wrestling, Barry told me that he had not been entirely candid with me. He had, he said, hit the Big Strike this time. And then, because we were such close friends, he told me where he had found the diamonds. Squatting in the street just outside the Mac-King Hotel, he drew a rough diagram in the hard red dirt while I struck matches so he could work. Later, when he had gone, I got a flashlight from my room and copied the diagram into my notebook.

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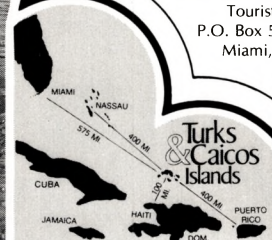
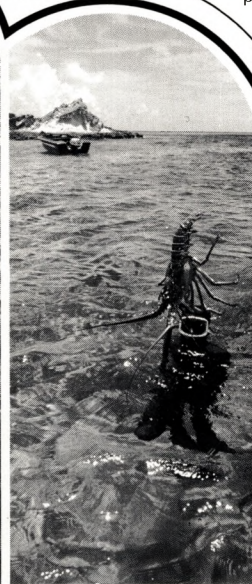
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Pepcor Ltd.: Front Street Package and group rates for Turks Head Inn and Salt Raker Inn Contact: Phil Pruss Phone: 2432	x	x	B	x	—	—	—	40	20
Underwater Research Ltd.: Front Street Package and group rates for Kittina Hotel Contact: Mike Spillar Phone: 2386	x	x	F	x	—	—	—	50	25
SOUTH CAICOS									
Turk-Cai Watersports Ltd. Package and group rates for Admiral's Arms Inn Contact: Earl O'Neil or Steve Parker Phone: 3223	x	x	F	—	x	—	x	70	35
Caicos Reef Lodge: East Bay Contact: The Manager Phone: 3205	x	x	B	x	—	—	x	40	16
NORTH CAICOS									
Seaquatic Divers Package and group rates for Prospect of Whitby Contact: Mike Hogg or Allen Gardner Phone: 4250	x	x	F	x	x	x	x	50	25
PINE CAY									
The Meridian Club Contact: Paul Hudson 305/358-0405	x	x	F	x	x	x	x	10	No
PROVIDENCIALES:									
Provo Turtle Divers Ltd. Package and group rates for Third Turtle Inn Contact: Art Pickering Phone: 4230	x	—	B	x	—	x	x	50	25
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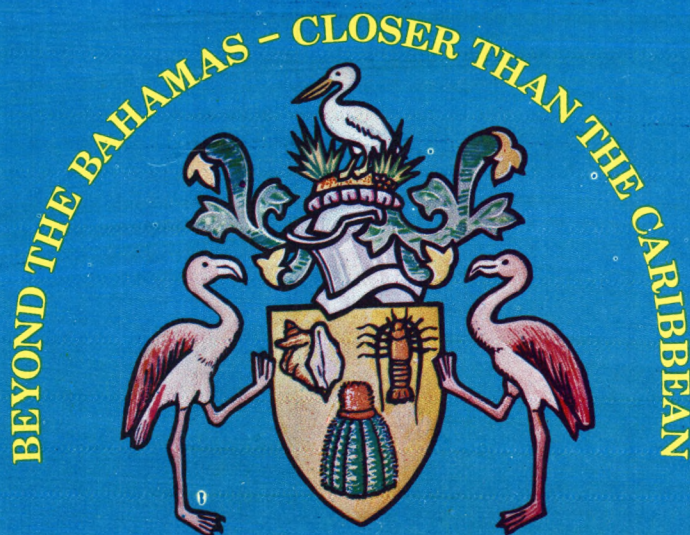
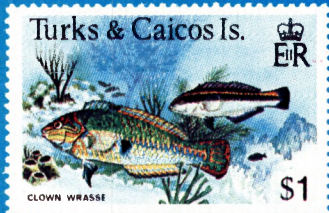
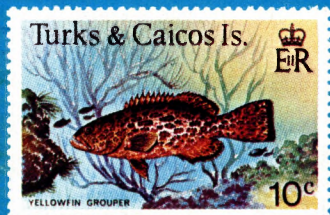
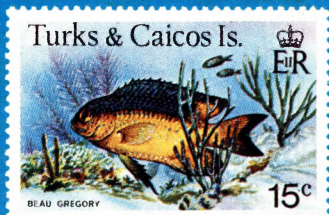
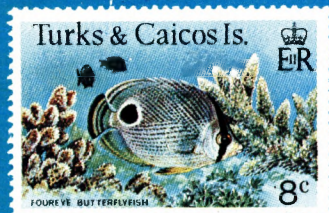
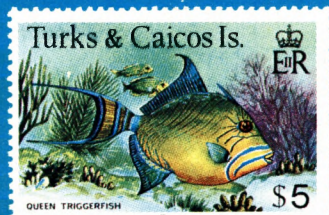
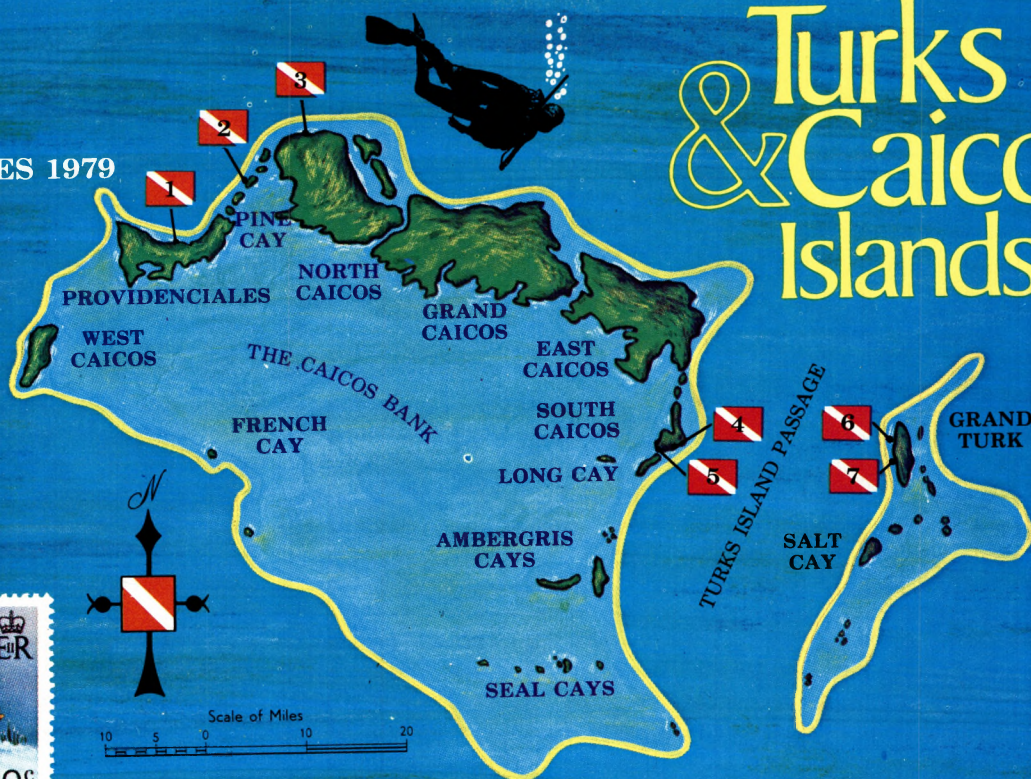
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Letter From

...Mauritius.

BY ROBERT MARX

The world is shrinking, and there are no more uncharted seas, no wide frontiers, no unmapped tropical paradises. But there are still a few places that qualify as unspoiled outposts, and the Indian Ocean island of Mauritius is one of the most rewarding. In 35 years of diving around the world, I have never encountered any more alluring spot. Last spring I went to Mauritius on a two-week trip to shoot some underwater footage. Three months later I was still there, and I left then only because I had to honor commitments elsewhere.

Moored on the Indian Ocean, Mauritius lies like a broad green leaf 500 miles east of the large island of Madagascar. It is 1250 miles east of the African coast and 6000 miles from Europe. The island is 40 miles long and 30 miles wide, an isolated remnant of a vast geological upheaval. Mauritius is the exposed tip of a volcanic colossus jutting up from the floor of an oceanic abyss 2000 feet deep. An extensive plateau rises to 1900 feet in the center of the island. Three basalt mountain ranges branch out from the plateau and slope to the sea. From 2700-foot Pieter Both Peak a climber can see all the island's 720 square miles. Between the mountain ranges, plains and valleys are carpeted in sugar cane, the island's chief source of income.

White coral-sand beaches cover much of the 100-mile coastline of Mauritius, shelving gently from a shoreline bordered with coconut palms and feathery dark green casuarina trees. Despite the island's large population — 900,000 in 1976 — there are still miles of deserted beaches where one can walk for

hours without seeing another soul. Most of the coast is sheltered by offshore barrier reefs that enclose wide lagoons of translucent water. Underwater visibility in these coral gardens is as good as in the Bahamas or the Red Sea.

Mauritius waters are influenced by two currents. The South Equatorial Stream runs near the surface, bringing warmth and marine life from the central Indian Ocean. Deeper down, the Aghuelas counter-current flows up from Antarctica bearing rich plankton to feed



the big pelagic fish just offshore. During my first deep-water dive off the southern side of the island I saw a blue marlin, a school of giant tuna, three sailfish, wahoo and several dozen sharks who kept a discreet distance.

Since Mauritius lies in the Southern Hemisphere the seasons, of course, are the reverse of ours. Tropical in summer and sub-tropical in winter, the climate here is humid year-round. Surface-water temperatures vary between 71 degrees in June and 80 degrees in January. Below 60 feet there is a considerable drop in temperature, and a full wetsuit is recommended.

Mauritius has always been a crossroads and a visitor can't help noting the diversity of elements that make up the national culture. Graceful French colonial buildings are flanked by Hindu temples, Islamic mosques and a variety of Christian churches. Most of the island's commerce is conducted by enterprising Chinese and Lebanese. The official language is English, but the predominant tongue is French

or Creole patois. Folk festivals mirror Indian, Chinese and African origins. Music floats on the air, mingling with the branches of blossoming trees and flowers.

The island's first visitors were probably Phoenicians, who sailed from the port of Elath in the Red Sea during the reign of King Solomon. They penetrated well into the Indian Ocean, searching for exotic products to fill their trading vessels. Arab merchant ships no doubt followed in their wake, but no Europeans visited Mauritius until Portuguese mariners sailed east after Vasco da Gama rounded the Cape of Good Hope in 1498. The Portuguese did not settle since they found no gold, gems or valuable spices.

The Dutch, who named the island after Prince Maurice Van Nassau, held the island from 1598 to 1710, but never established a permanent colony. In 1715 the French claimed the island and renamed it Isle de France, colonizing it as a sugar plantation. In 1810 the British took the island by force, the name was changed back to Mauritius, and English language and law imposed. But life on the tranquil island retained its French accent, and in 1968 Mauritius became an independent nation.

Getting to this island is an effort of sorts. By checking on special excursion rates, travelers can often save a bundle. Every Sunday British Airlines has a \$674 round-trip flight for those who plan to stay between 19 days and four months. The 22- to 45-day excursion fare out of Miami or New York is \$1600. U.S. citizens will need a visa that can be easily obtained by sending a current passport to the Mauritian Embassy in Washington, D.C.

More than 50 hotels and guest houses are available for as little as ten dollars a day including three meals. Luxury accommodations cost up to \$90 a day for a room with no meals. The average room in a nice hotel will cost about \$25 with all meals, a bargain long since extinct in all the other good diving areas.

continued

Adventurer, author and archaeologist, Robert Marx has been involved in and written about some of the most exciting underwater adventures of recent years. He found and partially salvaged the treasure ship Maravilla and wrote of some of his research in the book Sea Fever.

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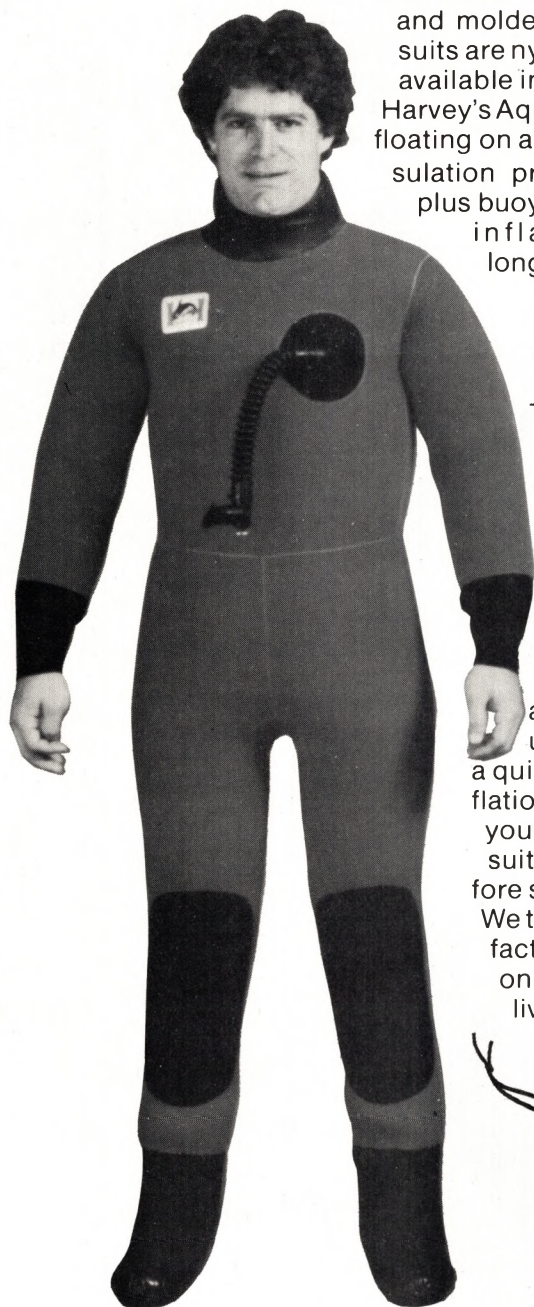
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MAURITIUS *continued*

Since the sea is the island's major attraction, most of the hotels are on the beach and offer facilities for the visiting diver. Thirteen of the larger hotels have dive shops with air. A tank, backpack and weight belt can be rented for five dollars a day. Air fills are a dollar. Many hotels offer half- and full-day diving excursions for \$15 to \$25 including tanks. More adventurous divers can rent a fishing pirogue with a guide for as little as ten dollars a day.

No trip to Mauritius would be complete without meeting the Mauritius Underwater Group. This group of about 70 diehard, friendly divers is a mixed bag of British, French, South Africans and Americans who think nothing of taking a day or a week off work to introduce a visitor to the island's spectacular underwater environment. I have never met a nicer bunch of divers. Not only did they show me most of the known wreck sites, but when all my equipment failed to arrive due to a French longshoremen's strike, the club members hurriedly furnished me with a Zodiac, outboard engine, ten tanks and assorted other gear at no charge.

Soon after it was formed in 1963, the club joined forces with the Maritime Museum and Mauritius Historical Society to explore the hundreds of old shipwrecks around the island. Mauritius lies on the track of merchant ships plying between the Atlantic and Indian Oceans. Over the centuries no fewer than 600 ships have been dashed to pieces on the barrier reefs. Another hundred sank in and around the island's sea ports during battles.

Mauritius is a paradise for shell collectors. More than 900 types of shells, including some of the world's most rare and valuable, can be found in the shallow waters encircling the island. Collecting is forbidden since some species are threatened with extinction, and visitors are permitted to take no more than six shells when they leave the island. The best way to see Mauritius' shells is by snorkeling at night with a strong underwater light. The best way to collect them is on film — bring your camera.

Mauritius is not the most convenient dive destination to reach, but the isolated island offers those lucky enough to find it something rare and wonderful beneath the surrounding waters. For the diver who has done Cozumel, the Caymans, the Bahamas and the Red Sea there remains a breathtaking dream — Mauritius.





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Letter From

...Washington.

BY PHIL TRUPP

January marks the first anniversary of Scubagate — the story of President Jimmy Carter's first underwater adventure. It has taken months to uncover the facts, but now finally the truth is out.

My initial contact with the White House press office came soon after the President returned to Washington from his meeting at Guadeloupe with the NATO ministers in January, 1979.

"Well, yes. The President did scuba dive at Guadeloupe. We can definitely confirm on that."

The speaker was a White House spokesman, a gentleman only two silver bullets removed from Press Secretary Jody Powell.

I asked other probing questions: Did the President enjoy himself? Did Rosalynn Carter get in the water? How did this happen anyway?

The White House spokesman became evasive.

"I'll have to get back to you with that," he said.

A month passed. No word. So I again phoned the White House and this time I asked for Jody Powell himself.

"He's very busy," his secretary said. "You know, of course, Prime Minister Begin is in town."

She made me feel appropriately insignificant. My small demands didn't seem like much in the general affairs of State, but I wasn't going to be put off. Investigative reporting means persistence at the stone wall.

A few days later I phoned Jody Powell again.

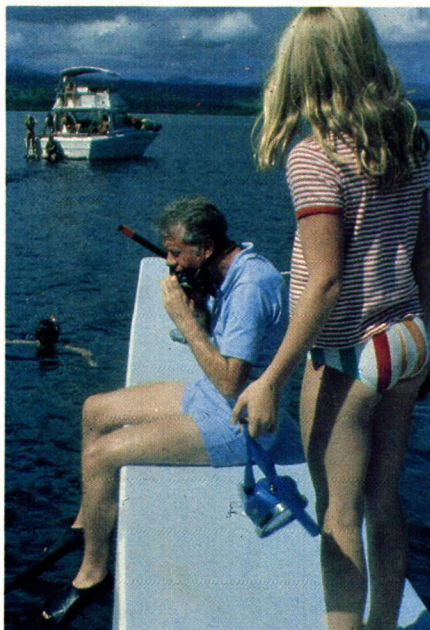
"He's in conference," the secretary said impatiently. She said he was with the President and his assistants were busy cranking out press releases.

I tried another approach and attempted to contact White House staffers

at the Executive Office Building. No one was available to answer my questions. They were always in conference. Always.

Now I became impatient. Damn it! — I've been a reporter in Washington a lot longer than Mr. Carter has been President of the United States. I was pushy, which is another way of saying I was going to make a pest of myself.

When it became obvious that the White House was stone-walling it I decided it was time to play "sources said." It is a fact of life in this town that congress-



GLUSKIN/GAMMA-LIAISON

sional aides and the Russian Embassy know everything, and through them the details of Scubagate unfolded.

Here's what took place at Guadeloupe:

After the NATO meeting Mr. Carter and daughter Amy decided they'd like to give scuba a try. *Time Magazine* reported the incident as an afternoon of "scuba do," and there was a photograph of the President seated on a dock wearing fins and spitting into his face mask. Amy stood behind him holding a mask of her own. She was not spitting in it.

About 50 yards away a boat crowded with VIPs was at anchor, and in the water a dozen Secret Service agents bobbed up

and down. They'd been specially trained to assist the President in the event of trouble. They hadn't forgotten the ill-fated CIA plot to kill Fidel Castro by lining his wet suit (the Cuban Premier was an active diver and spearfisherman) with a caustic substance that fizzed like Drano. It didn't work on Fidel, but who knows if equally clever Cuban agents might not seek revenge here at Guadeloupe?

The idea for a presidential scuba dive came from Vice President Walter Mondale. Mondale is a sometimes diver/sometimes snorkeler, and the President's public relations man, Jerry Rafshoon, went for the suggestion. He pointed out the trendiness of scuba and how it's used in TV commercials for everything from General Electric to the O.B. Method.

It was one thing to suggest that the President challenge the deep, but it was quite another getting the details worked out properly.

An American scuba instructor at Guadeloupe was more than slightly startled when approached by the Secret Service and ordered to transform the President of the United States into a man-fish. The instructor innocently wondered if Mr. Carter owned a C-card. What's a C-card, the Secret Service wanted to know.

Then came the matter of checking the compressors and the air in the President's scuba tank. The Secret Service decided to test the air by ordering someone to breath from Mr. Carter's regulator moments before the President entered the water. If the sacrificial Secret Service agent was stricken, the President would be alerted that something was amiss. And of course no one including the NATO Ministers were to know anything until D-Day.

D-Day arrived and there was general confusion. Rosalynn Carter remained aboard the VIP boat on a precautionary word from the Secret Service. Mr. Carter was miffed.

As the President was helped into his gear with Amy standing by (she refused to dive) someone asked Jody Powell if Mr.

Phil Trupp is Sport Diver's Washington connection. An experienced author and diver, Phil has spent 20 years covering the Washington scene for major publications.

continued



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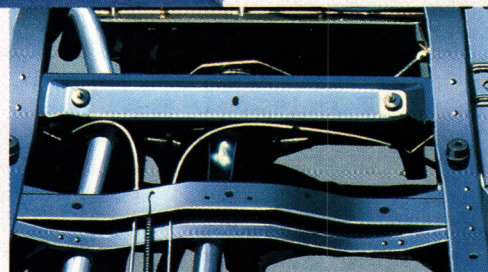
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WASHINGTON *continued*

Carter actually knew how to scuba dive.

"God, I hope so," he said.

After a final check the President and a crew of Secret Service agents, novices all, jumped into the water and got themselves high on a very shallow reef.

But the Secret Service men didn't like it. This was something unique in security, not at all like checking windows and rooftops and planting spies in the crowd. And what about Jaws. Who was thinking about Jaws? After all, this was the President of the United States, for chrissakes!

Jaws didn't arrive. The wet suit didn't fizz. The air was good. Thirty-five minutes later Jimmy Carter stood on the dock and grinned.

It was "fun," he said.

Would he repeat the experience?

The President said he didn't know.

Essentially, the story of Scubagate ended there — but not quite. As an afterthought I called the White House press office on the off-chance my early inquiries had been answered.

It was a steamy August afternoon and the President had just returned from his Camp David Domestic Summit. The secretary on the other end of the line was characteristically bored.

"We're awfully busy. Is this a political matter?"

I explained it wasn't, but that I'd left some questions with a press assistant some months earlier about the President's experience at Guadeloupe.

"Hold on," she said.

I heard the sound of papers rustling and when she came back on the line she said yes, there was a memo regarding my inquiries. I could hardly believe it. So what if it was nearly a year late. A story as shockingly true as Scubagate takes time and persistence. I was about to scale the stone wall and I was thinking: I'm going to get an actual statement by the President of the United States, an insight on the underwater world of Jimmy Carter.

Carl Bernstein, eat your heart out!

The secretary read from the memo:

"The President was asked, 'Did you enjoy scuba diving?' and the President said, 'Yes, I did.'"

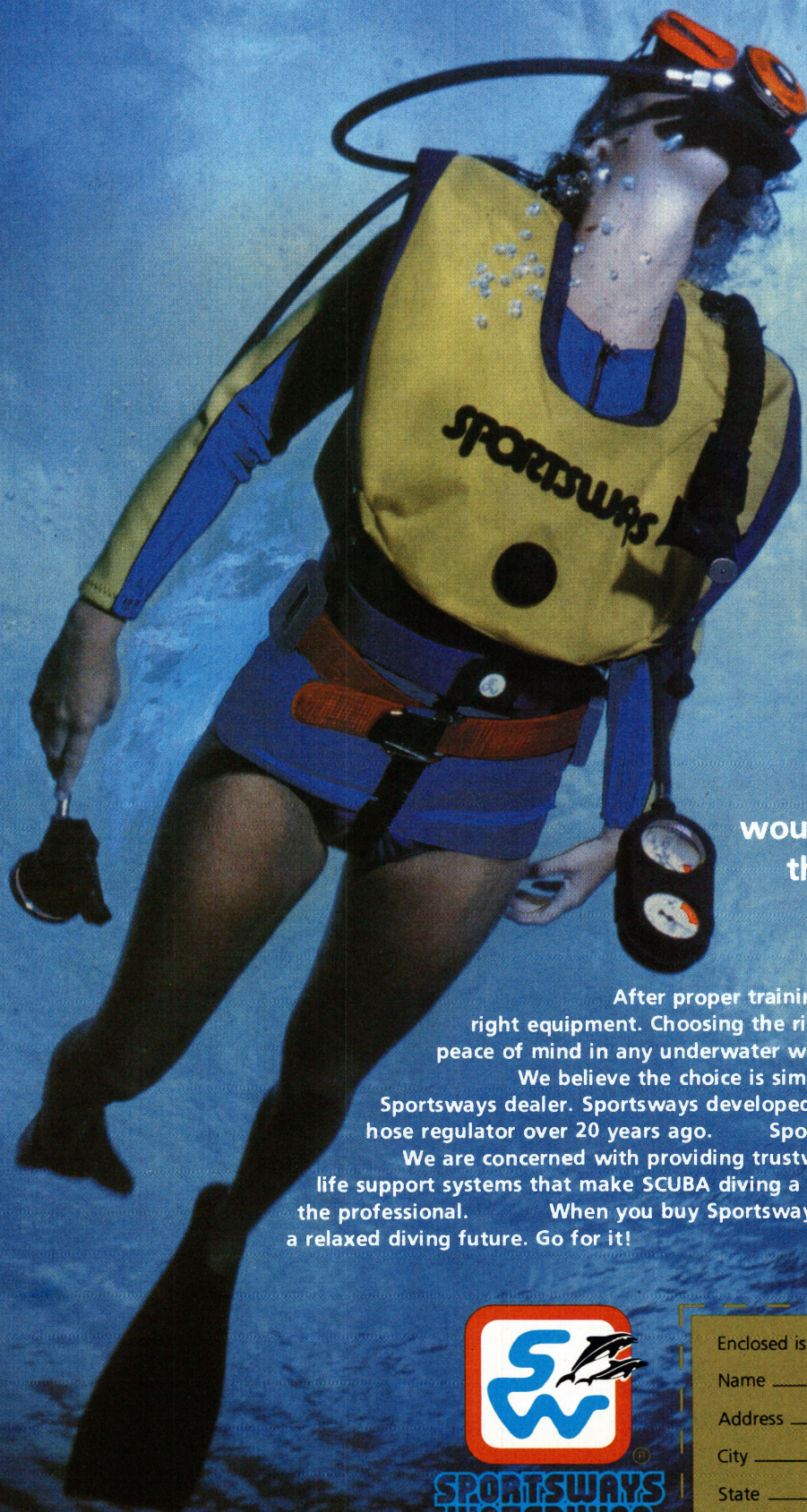
"The President was also asked, 'Would you do it again?' We didn't get anything on that one.

"You wanted to know if the President had anything to say, if he gained anything personally, did he bring something back, and the President said, 'Sunburn.' Is that all you need?"

Definitely.

Thank you, Mr. President.

continued



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TODAY'S LEADER IN DIVER EDUCATION

Washington Currents

New Sanctuaries Studied

Three sites off the California coast and one in the Gulf of Mexico have been picked for study and possible federal designation as marine sanctuaries.

The sites being studied by the National Oceanic & Atmospheric Administration are Monterey Bay, an area near the Channel Islands, Point Reyes and the Farallon Islands.

The Gulf site is the controversial Flower Garden Banks coral reef about 100 miles off the Louisiana-Texas coast.

At present, there are only two designated marine sanctuaries — an area north of Pennekamp Underwater Park, Key Largo, and the wreck of the Civil War ironclad, *Monitor*, in 200 feet of water off the coast of North Carolina.

NOAA officials say the California sites represent some of the most ecologically important waters in the Pacific.

Robert W. Knecht, head of NOAA Coastal Zone Management, said the West Coast areas "abound in values the marine sanctuary program is intended to preserve," including marine mammals and various endangered species.

The Flower Garden Banks will be the subject of a soon-to-be issued environmental impact statement, one of the first steps in selecting a sanctuary. The statement will be critically important because oil and gas development in the Gulf is booming. NOAA ecologists are locked with the Bureau of Land Management, with BLM wanting narrow boundaries on the Flower Garden and NOAA insisting the reefs need more space.

For two years the California sites have been controversial as Pacific offshore developers and commercial fishing interests move in. They are opposed to any off-limits federal code.

Crystal River Nuke

The Nuclear Regulatory Commission's office of regulations has concluded that the Florida Power Corporation has "satisfactorily" completed changes recently required by an earlier order at the Crystal River Unit-3 generating station.

But, NRC said, as a result of a separate directive issued in early 1979 the utility continues to conduct a review of

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continued

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Captain Jacques-Yves Cousteau
Chairman of the Board



concrete expansion bolts used to anchor pipe support base plates. The NRC has concluded that many of the bolts don't live up to seismic design requirements.

Unit-3 had been shut down for refueling when the NRC confirmed last May that the unit must remain dormant until it did something to improve its response to what the commission called "transient events" in the feedwater system.

The largest population of manatees on Florida's west coast spends each winter near the reactor in Crystal River. During extremely cold weather, they have been known to congregate around the reactor's thermal outfall pipes.

Puget Sound Study

A group of federal, state and university scientists has moved ahead with a major search for toxic substances in central Puget Sound.

The new study is managed by the federal Marine Ecosystems Analysis (MESA) Puget Sound Project.

Allocated for the project is \$1.3 million a year, with a proposed time frame of five years.

Emphasis on toxic substances comes from certain abnormalities observed in the Sound's bottom fish. The scientists think the abnormalities are caused by "severe environmental stress" brought on by the toxic substances.

Dr. Howard Harris, MESA director, says the abnormalities have been apparent for a long time, especially in English sole and starry flounder. The fish show up with liver tumors, fin rot and scale cancer. Similar symptoms have been observed in some species living off Los Angeles and New York.

Toxics to be studied include petroleum constituents, synthetic organics and trace metals.

Fire-Retardant Chemicals From the Sea

Use of compounds from aquatic plants to help make clothing safer from fire is being studied by Sea Grant researchers at the University of Washington.

They are analyzing the properties of an abundant Pacific Northwest alga which has enzymes that cause chemicals to bond fabrics, making them fire-resistant (it's no longer legal to advertise products as fire-proof or water-proof).

The researchers say the plant en-

zymes could be a cheap and effective substitute for fire-retardant chemicals removed from the market because they were linked to incidence of cancer.

Monk Seal Endangered

The Caribbean monk seal, indiscriminately killed for hides and oil since the days of Spanish exploration of the Western Hemisphere, has been listed as an endangered species by the National Marine Fisheries Service.

Government officials fear the animal may already be extinct. Surveys and studies have failed to locate any of the mammals in its former habitat in the Gulf of Mexico and the Caribbean.

Under the Endangered Species Act of 1973, an endangered species is one in danger of becoming extinct throughout a significant part of its range.

Eagle-Eyed Pigeons

The Coast Guard will spend \$146,000 in the next two years to train pigeons to spot people lost at sea. This corps of pigeons will be called a "Rescue Squab."

A recent report says that in various experiments, pigeons strapped on the outside of a helicopter outdid Coast Guard air crews by a wide margin when it comes to spotting objects at sea.

However, in the first casualty of its kind, the first three pigeons drowned when the helicopter they were riding in crashed off Hawaii.

The Coast Guard is paying the Navy to train ten more pigeons for duty as part of what is called Project Sea Hunt.

Now, that has TV overtones: Fighting men and their pigeons in dramatic weekly episodes. Quinn-Martin Productions, take note.

Treasure Hunt Italian Style

Underwater treasure hunters may go an entire lifetime without hitting pay dirt, but in Italy, bandits used scuba gear to pull the treasure find of the century.

Police say the thieves used the sewage system to reach the wall of an underground safe deposit box room of a bank, which they penetrated with waterproof drills. They emptied the boxes of billions of lire and escaped undetected. The Sewer Heist took less than an hour.

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Once you've had a taste of diving, it's only a matter of time before you succumb to the ecstasy of diving The Bahamas.

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If you're a beginner, we'll give you instruction and have you in the water in no time. If you're already a certified diver, we can give instruction at the expert level, and in specialized diving such as blue hole, cave and decompression diving.

Then come ashore and discover our fabulous golf, tennis, sport fishing and endless stretches of pure white sand beach that the two of you can have all to yourselves. After a dazzling sunset, wind down in the intimate ambience of our Out Island clubs. Or wind up in the glamorous discos and casinos of Nassau and Freeport.

In The Bahamas, you'll find hundreds of islands, each with its own personality, yet all with one thing in common. Scuba. You'll have dozens of resorts to choose from, some catering exclusively to divers. All with superb facilities, safety gear, top guides, and plenty of back-up equipment.

Your Travel Agent or dive shop can design a Bahamas diving package that's just right for you. For more information, call toll free 800-327-0787. In Florida, 800-432-5594. In Dade County, 443-3821.

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Photo by Dick Harrison



Tote your gear in either of these two new duffles. The Super Duffel has a three-cu. ft. capacity and is made from heavy black nylon with red trim, double pull zippers, heavy duty adjustable shoulder straps, large side pockets and a hidden inside end-pocket. \$36.

The Vinyl Equipment Duffel features heavy duty straps, hidden end-pocket and has a 2 1/4-cu. ft. capacity. \$25. Both from Aquarius Mfg. Co., 60 Griffin Rd., Hudson, NH 03051.



For closer underwater inspection, install the Microsight Magnifying Lens in your facemask. Simply dab a small amount of clear silicone sealer on the lens, press inside faceplate, clear any air bubbles and let dry overnight. \$3.50 plus \$1 handling. Order from Waterlou Enterprises, Box 125, Mountainville, NY 10953.

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After a day of diving get into something comfortable: 100 percent natural cotton drawstring pants. Easy to get into and out of, they are machine wash/dry and can be ordered with a matching natural white top in ES, S, M & L sizes: \$13.95; pants come in S, M & L sizes: \$12.95. Goodshirts, 623 Walnut St., #PR-SD, Camden, SC 29020.



Identify your regulator in a crowd with a personalized solid brass dust cap. Up to 23 letters can be stamped on the base of the cap and it fits all regulators. Guaranteed not to crack, it comes with standard O-ring and heavy duty nylon lanyard. \$14.95 from Sea-safe Co., Box 724, Mahopac, NY 10541.



Charge your Ikelite Modular Super and Movie Lite in three hours. Paragon's quick charge conversion system is completely safe and automatically switches to trickle charge when fully charged. \$29.95. Send battery pack to Paragon Enterprises, 5681 N. Guilford Ave., Indianapolis, IN 46220.

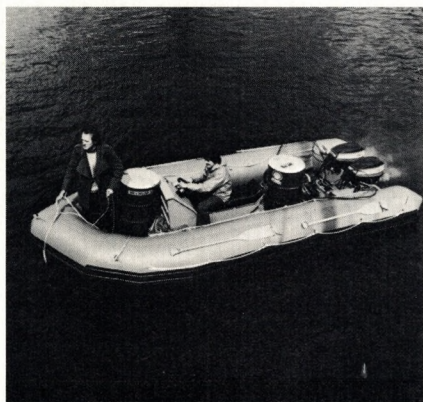


Forget hauling this catamaran to the water. Semperit's inflatable, of lightweight aluminum construction is uncapsizable and stows to fit inside the station wagon, not behind it. Hypalon outer skin construction and the main sail and jib are polyamide. Suggested retail \$1495, all accessories including outboard motor. From Steyr Daimler Puch of America, 80 Field Point Rd., Box 7777, Greenwich, CT 06830.

continued



Compact yet competent, the CM-40 is a self-contained underwater color mini-cam, one third smaller than previous models. Suited for hand-held or remote operation, it has a 12.5mm f/1.5 color-corrected lens with a 65-degree diagonal angle of view. The 6-by 14-inch housing is functional from 1000-2500 feet and its epoxy and aluminum design features circuitry on replaceable boards for simple servicing. Total system with options, approx. \$10,000. **Sub-Sea Systems, Inc.**, 753 W. Washington Ave., Escondido, CA 92025.



Haul payloads up to 2310 pounds with the rugged, inflatable Avon Workboat. Ready for industrial, commercial or military use, the 19-foot ocean craft features a 7 foot 8 inch beam. Five individual air compartments provide safety and reliability. The craft has thick marine ply floorboards coated with an anti-slip surface and is powered by either single or twin 70-hp engines. Approx. \$7000. **Imtra Corp.**, William Farnham Jr., 151 Mystic Ave., Medford, MA 02155.



Designed for low volume and increased downward vision, the Montego mask comes in a choice of four frame colors and is available in either soft rubber (\$18) or hypo-allergenic silicone (\$35). From **Mares USA**, 722 Genevieve St., Solana Beach, CA 92075.



Parkway's Racy Shorty has body-contoured tailoring to ensure a comfortable snug, professional fit. Short sleeves and pants taper to rolled ends and the Nylon-2-sides design provides extra warmth. Comes with racing stripes in contrasting colors. Men's and women's styles, \$73.60.

The Catamaran 2-piece suit — coveralls and long-sleeve fitted jacket — features 1/8-inch neoprene with nylon for flexibility and comfort. Coveralls have Velcro-fastened shoulder, ankle zippers and knee pads; jacket has front and wrist zippers. Available in women's sizes by custom order only. \$158 from **Parkway Fabricators**, 241 Raritan St., South Amboy, NJ 08879.



Camels do it — why can't you. Take your water supply diving with you with the four-gallon capacity Water Caddy. Self-pressurized container is portable and perfect for dousing dive or camera gear, drinking water, gardening, camping or fishing. Stores flat and comes with seven-foot hose, shower and jet nozzles and measuring tape. Optional accessories include hand pump, nylon brush and dolly. \$29.95 from **Mirage Audio Visuals**, 1431 Hewitt, Houston, TX 77018.



Enjoy a panoramic view of the undersea world with the Peri-Vision 3-Window Mask. Translucent silicone gives a feeling of openness and the contoured skirt with feathered edge and double seal fit snug and comfortably. A molded fingerwell nose grip makes compensation quick and easy. Suggested retail price \$45. **White Stag**, PO Box 5308, Carson, CA 90745.

continued

A large, atmospheric underwater photograph serves as the background for the advertisement. It shows several divers exploring a deep, blue environment. Sunlight rays penetrate the water from above, creating a shimmering effect. Numerous fish of various sizes are scattered throughout the scene, adding to the sense of a vibrant marine ecosystem. The overall tone is mysterious and adventurous.

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Bob Soto's Lodge, The Caymans. Live coral reef offshore. 7 nights. Daily breakfast and dinner. \$287.

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Club Caribbean, Runaway Bay, Jamaica. 7 nights. Private cottage. Daily breakfast and dinner. Nightly entertainment and disco. \$424.

The Seven Mile Beach, The Caymans. Dive with Bob Soto and his crew. 7 nights at the Beach Colony Club, Cayman Sands Village, Holiday Inn or The Royal Palms. From \$344 to \$380.

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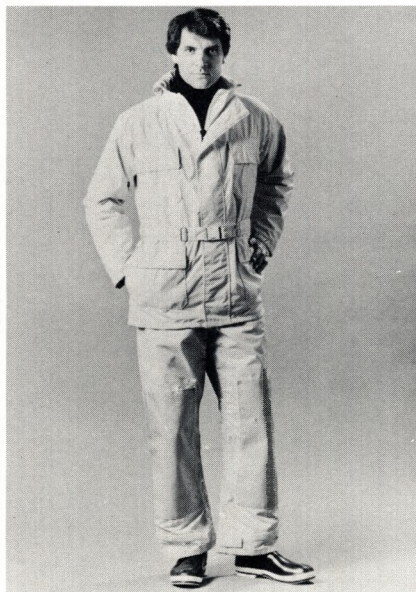
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Buckle up with a handsome, hand-cast, polished dive belt buckle. Featuring diver down flag, the 2½- by 3¼-inch buckle comes in three metals: brass plate, with a thick patina of antique brass, \$8; solid bronze, polished to a high gloss, \$23; sterling silver, which becomes more priceless with age, n.a. Order from **bjb Diver Gifts**, Box J, Iola, KS 66749.



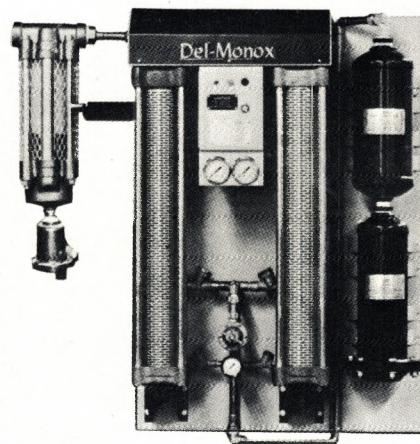
Laugh at stormy weather in Gore-Tex coated Weathergear. Unique microporous membrane allows vapor to escape, but prevents water from entering and inner nylon lining completes the two-layer comfort system. Jacket has roll-away hood, adjustable neck closure, weatherflap system, over-size zipper, double cuffs, belted waist, double pockets, drawstring and liner access for drainage, air circulation and maintenance. Bib-style pants feature nylon-lined and reinforced knees and non-skid Cordura seat patches. \$200 from **Atlantis Weathergear, Inc.**, Bay St. at the Waterfront, Sag Harbor, NY 11963.



Hold-A-Tank is a simple way to secure diving cylinders to boats, cars or in storage. Just push tank against the holder, it snaps right in and holds tight. It will not scratch tanks and keeps regulators and pressure gauges from being banged around. Made from high-impact plastic, the Hold-A-Tank comes with a 1-inch nylon strap and taber buckle for an extra measure of safety. \$12.95 from **Marketing Control Corp.**, 125 Worth Ave., Palm Beach, FL 33480.



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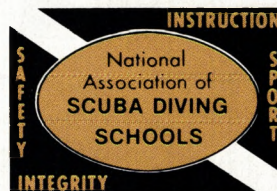
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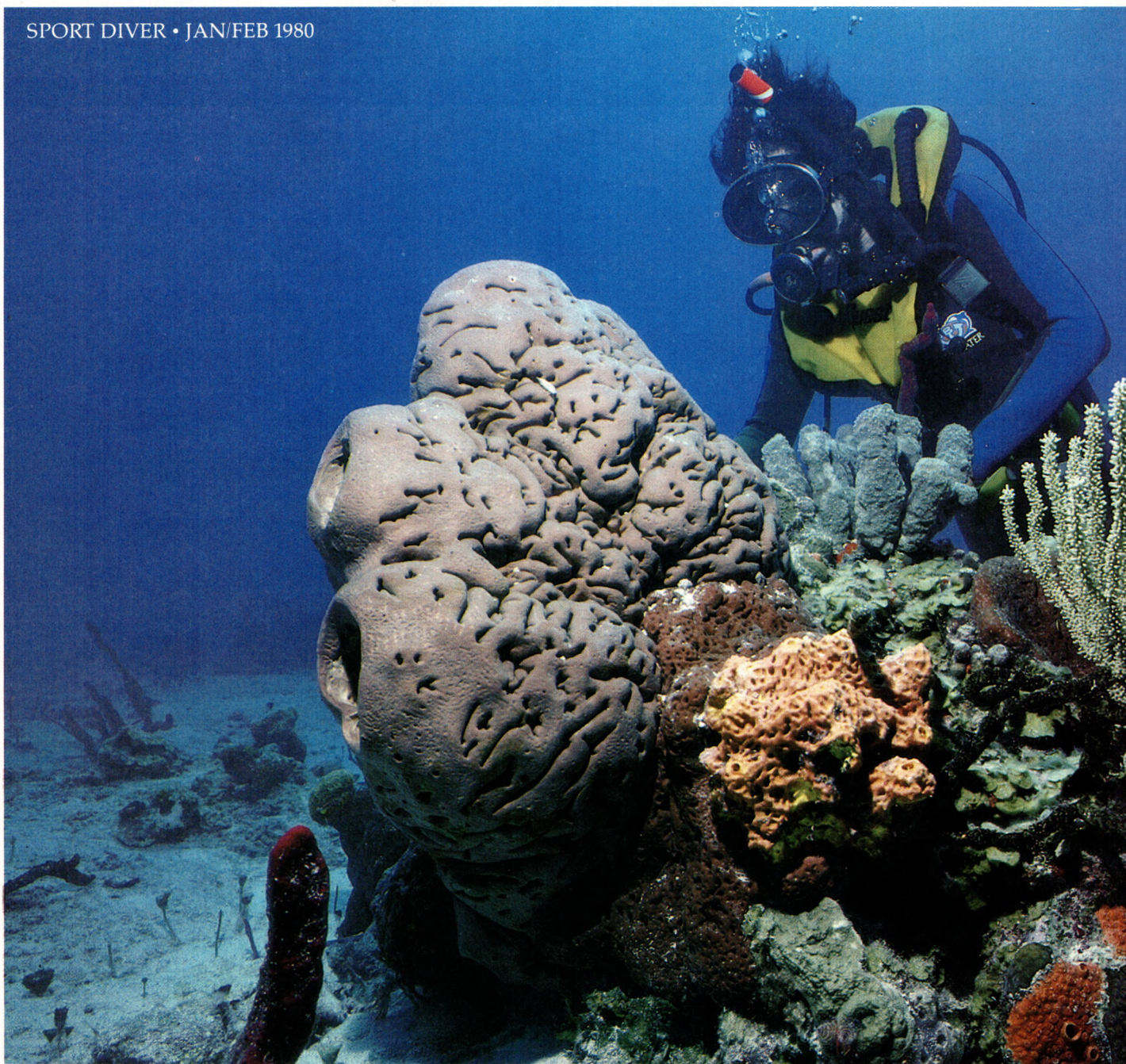
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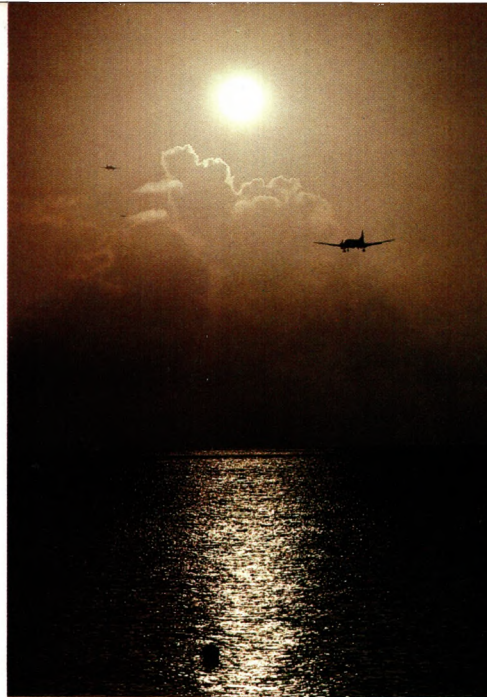
*These ever-popular islands can still give it to you shallow
or deep, with mainland convenience or out island simplicity.*

BY PHIL TRUPP

PHOTOGRAPHY BY FRED BAVENDAM



Bimini's waters produce an unusual assortment of photographic subjects such as this sculpture in sponge, shot at about 90 feet on the Bimini Wall. Above right: Towering cumulus clouds are a common sight near Bimini's rural airfield, where aircraft land before dark or not at all.



RICHARD STEWART

We are flying due east off the coast of Miami, destination Bimini, and in the late afternoon we'll take off for Freeport, Grand Bahama.

From the window of our single-engine Piper Lance the pollution haze is purple above the city. Air is smooth. As the mainland disappears the sea appears inky blue; deep water of the Straits of Florida, the endless carving of the Gulf Stream through this chasm.

There are three of us: Freddy Bavendam, 34, photographer. He calls himself Fred, and I use Freddy when I want to get his goat. Matt Huff, 26, pilot, staffer at Ziff-Davis' *A/C Flyer*, licensed to fly since age 16. It is his first flight into the "Triangle," and within little more than a week he'll cover more than 2000 miles of open sea. He has that John Wayne way and expression, a good trait in any pilot. I am along to observe, to dive, to take in everything I can — from little green men to blue holes.

It is 54 miles from Miami to the first sight of Bimini, which is actually two islands: North Bimini, which from the air looks like a boomerang, and the more massive south Bimini. Trailing to the south are a string of islets set among the shallows. The water is absolutely transparent, and it's easy to trace the reefs and dropoffs from the air.

This cluster of landfalls called Bimini is the top of a mountain range more than a mile high. It was born about 200 million years ago, when there was a volcanic thunderstorm on the seabed

between the North American continent and Africa. It was during that unimaginable fury that the base of the mountain range was cast. Since that time a sea has formed, a Great Shallow Sea.

For miles there are shoals and shallow water. In between are deep chasms dropping more than a mile to the floor of the ocean. We can experience only the tiniest portion of this great mountain range, which has 20 peaks on which islands have formed. At Bimini, we will see the edge of the mountain where the Gulf Stream sheers along the cliff face and where the mountain plunges to the floor of the ocean.

We dive with Neal Watson, Evel Knievel of the underwater world. Among other things, Neal is getting up for a swim from Bimini to Ft. Lauderdale: 110 miles — underwater. He's already done 66 along the coast of Florida. It is only natural that Neal should take us to the wall this morning.

This is to be Freddy's dive. I haven't been below a hundred feet in two months, and I want to acclimate slowly.

At about 75 feet there is a layer of planktonic matter. It precludes any sight of the dropoff from the surface, and as Neal and Freddy disappear into this cloudy layer, I return to the boat.

Jackson, our boatman, follows the bubbles. Neal and Freddy are drifting along the face of the mountain. When they appear at their ten-foot decompression stop I go back into the water with an octopus. The divers have been down a long time and are low on air.

I envy Freddy the dive, even though it's dark and gets to 175 feet.

"This is no depth for sport diving,"

Phil Trupp is Sport Diver's Washington correspondent.

continued



Freddy complained to Neal and I later.

But then Freddy isn't sporting it; he's working, recording images. Depth was acceptable under the circumstances, and Freddy is impressed by the massiveness of the mountain. We look forward to good Kodachromes.

Later I speak to Neal about the wall and other adventures.

"I like to go down on that wall pretty deep and drift the whole continental shelf," Neal says.

The remark impresses me because Neal is one of those men who thrive on what seems to be impossible. Here is a 38 year-old-man, a third-degree black belt (Goju), a man of 185 pounds who bench-presses 350, who was a stunt man for TV and movies, telling me the wall, and it alone, will never bore him.

Our next dive is at "Atlantis." The site has also been called the "Bimini Road." In about 15 feet of water there's a series of generally rectangular blocks, measuring about four-by-eight, lying next to each other as if placed there by some intelligent race — perhaps human. A generation of psychics, sensitives, UFOers, Devil's Trianglers, and ordinary observers such as our crew, have seen these blocks at the northeast corner of north Bimini, and they have wondered. Neal speaks of researchers whose electronic devices do odd things along the road of "Atlantis." But Neal discounts most of the outer-space/super-race theories: "I've seen stuff like this before," he tells us. But I haven't. There is little about the formation to suggest a natural origin. Straight lines seldom occur in nature, and so many of them together are baffling.

We make the shoot and head for

Hawksbill Reef. This is Day One, Shoot Three. That's pretty good, and I wonder if we'll be able to keep it up. Tables are tables, and Matt has weather to watch, and we have much ground to explore in ten days.

Hawksbill is a patch reef forming a semi-circle of coral heads. Visibility isn't good; maybe 20 or 40 feet, but enough to see whatever marine life is there. Hawksbill isn't fishy — or it wasn't that day. Neal says it's a popular shallow dive (40 to 45 feet) with lots of coral. Close by is Moray Alley at 65 feet, which gets its name from obvious sources.

Off southern Bimini there's Victory Reef, a shallow wall starting at 40 feet and dropping to 100. There also is the *Sapona* wreck, which sticks out of the water like a rusting lament. The hulk is used for strafing and rocket practice, and the poor ship has served well beyond a decent call of duty.

Neal told us of a blue hole off Cat Cay to the south. The opening shaft begins 20 feet down and drops to a sandy bottom at 50 feet. From there, two large tunnels branch off. Nobody knows where they go; and, in fact, blue holes are a mystery to just about everyone. In a way, they are the metaphors of the Great Shallow Sea. We will find ourselves pursuing theories and speculation on blue holes throughout our travels, wondering at them, wondering how so many could be so closely spaced together on this mountaintop of the Bahamas.

In the late afternoon I am with Neal in his apartment overlooking the harbor, where big-game fishermen congregate year-round. He shows me his scrapbook: photographs of men smashing huge blocks of ice laid across his chest;



STEPHEN FRANK

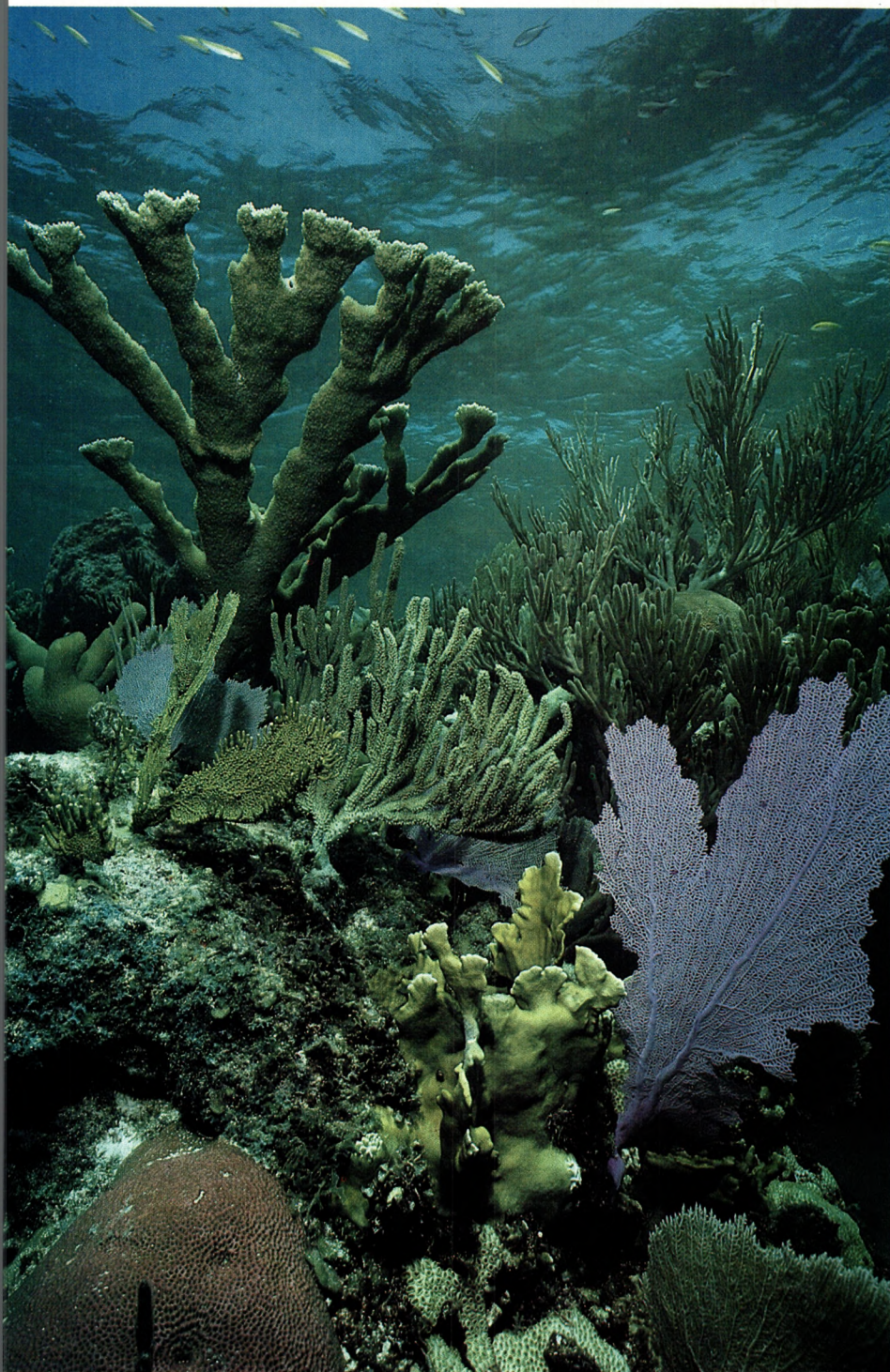
photographs of Neal in some sort of quasi-helicopter making some record crossing for a kite with a rubber band motor, and more and more. I begin thinking Neal Watson and Bimini could occupy me for weeks.

Okay, Matt. I'm coming. We've got to get to Freeport before dark (you don't fly after dark in the Bahamas).

At the air strip Matt points to an old B-26 bomber.

"Now what do you think she's used for?" he asks.

We depart 6:04 p.m., and head



Facing page, above: The Bimini Road, an eerily regular formation of rectangular rock slabs, has long evoked speculation among scientists and seekers of lost civilizations. Facing page, below: Easier to explain is the wreck of the Sapona, lying in shallow water near Victory Reef. Left: Painted wrasse, Halichoeres pictus, and bigeye scad, Selar crumenophthalmus, converge on a Grand Bahama reef dominated by elkhorn and purple seafans.

the major dive sites in the area:

Littlehale's Lair, 90 feet: named for *National Geographic* photographer Bates Littlehale. It's a series of crevices and mini-canyons. Viz: 100 feet; water temperature in the 80s. Off-and-on appearances of large marine life. Good dive for those who enjoy poking about in holes, swimming into tunnels and grooves which wind maze-like over a sloping coral bottom.

Former Hydrolab site, 40-60 feet. Hydrolab stood for five years on this big concrete slab before it was removed to St. Croix. There is an artificial kelp forest here, made of white linen. It is fascinating to see what happens to portions of the ocean which man inhabits on a regular basis. Depending on how you look at it, property values go up or down. Hydrolab and its transients have had their impact. The fish seem to have moved to choicer real estate.

Pygmy Caves, 40-50 feet. Nice, easy dive on patch reef with fairly large coral formations. Lots of planktonic matter in this warm water. You'd have to be a pygmy to poke into these small caves. Each is life-filled, a world unto itself, and a hand light is a good tool on this dive.

Unnamed shallow reef at 15 feet. Lovely elkhorn and fishy, fishy, fishy. You can stay down all day on this one.

Eden Banks, 50 feet. More patch reefs, caves and grottoes.

Edge of the Ledge, 100 feet. Beautiful dive straight down the anchor line. Like sky diving. Here the island goes true vertical after 130 feet. Dropoff is measured in thousands of feet. Top of the wall is decorated by big basket sponges, and there is a scalloped formation dipping to 130. We are armed with

northwest, past the white and red spire of Great Isaac Light. The ocean bottom rises to within a few feet of the surface, and there is white water around the shoals. Through the haze Great Isaac slices across the horizon. In the distance a dark water spout reaches out of the clouds.

Check into Luycan Bay Hotel, wash, dine together at the Stoned Crab, and I spend the evening reading and watching Tom Snyder on TV. A year ago, the Luycan

Bay seemed a bit brassy; now, it has a restful, quietly efficient air.

Grand Bahama is a big island (more than 500 square miles) and has four dive operations. It is a haven for scientists and explorers, and many generations will pass before the island's offshore ecosystems are accessible. It invites constant discovery, the kind of place that a hardhat diver like Tony Imperato, a man who spends weeks at a time 500 down in the North Sea, goes to have a busman's holiday. Tony is having fun unwinding, but we are at work. Here are just a few of

continued

hotdogs to feed Mad Dog, the local Nassau grouper. Jack Brackett of the Underwater Explorers Society (UNEXSO) warns: "Keep those fingers tucked in!" He shows us his hands, scarred by evidence of how Mad Dog got his name. There is a circular current here. I get caught in it and am swept out over the wall. On the way back I look down. There it is: the blackness, the black star of the abyss. It never fails to inspire. I'm happy to be back at the ledge — even with Mad Dog and his outlandish appetites. Later I ask Jack why Mad Dog hasn't become someone's meal. "Hey, Mad Dog's a survivor" he replies. "Mean little bugger."

Ben's Cave, inland blue hole. If you've seen it all (or think you have) Ben's Cave is the thing for a jaded traveler. I dived it with UNEXSO's Bruce Nyden, a young, burly and poetic diver whose tales of caving hold my attention endlessly. The divers climb down a ten-foot ladder to the cave entrance. There is a limestone roof screeching with bats, and the surface water (fresh water and rather chilly) is covered by a filigree of their droppings. The main room is huge, and though we are never out of the light it's black dead ahead. Suddenly our lights pick up a series of massive stalagmites. They rush out the darkness like giant redwoods. Spooky, seeing anything that large in the water. I sit on top of the formation to catch my breath. The light beam reveals portions of the cavern. The roof is craggy, hung with limestone diamonds. I see a small rainbow in my light beam. Farther back the cave narrows. Bruce says it's been penetrated 1000 feet where there's a room that looks "like taffy pulled apart." Inviting — but not for me. We descend through the fresh water top layer to the warm salt water on the bottom. Comes the halocline: a mix of fresh and salt water that makes it seem as if Vaseline has been smeared on our faceplates, and the blurriness is disorienting. I stick my

head up a few feet and — snap — in the fresh water all is clear again.

I make a point of visiting most of the dive operations at Grand Bahama. All have good, full schedules. And, in Freeport at the time of our visit, we heard a new outfit had just opened at the Xanadu Hotel called Xanadu Divers.

There is a dive operation also in Freeport that specializes in group travel. Scubahamas located in the Victoria Inn, arranges trips for dive clubs, instructors and dive shops. Owner and operator Tom Kenwright, is a PADI open water instructor who came to Freeport in 1969 and decided to stay.

I visit with the gentlemanly Nigel Froome, who, with his partner, Shelby Tostevin, handle diving at West End's elegant Grand Bahama Hotel.

Nigel seems to belong in a drawing room with Willie Maughm instead of behind the counter of a dive operation. British born, he is outspoken and he has a message for us back in the States:

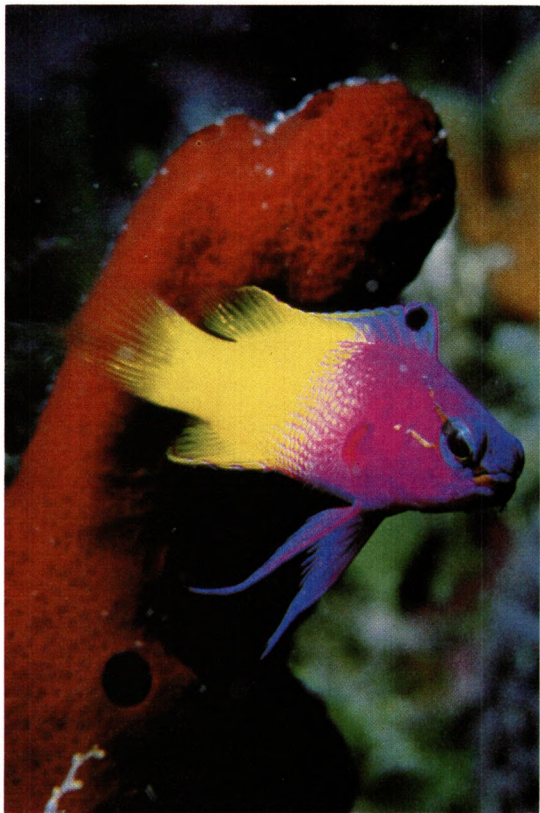
"What are your scuba instructors doing?"

Nigel tells of divers who look like Christmas trees hung with gauges and gadgetry, divers who can't take mild currents, who are forever on the razor's edge of disaster, who can't swim, can't navigate: "Who can't handle it. Simple as that!"

Nigel has been at the hotel 22 years, and he's conservative in a reasonable way. Eighty feet is as deep as he goes with his visiting Challengers of the Deep, and he takes no more than four divers at a time. They say they will not run an underwater assembly line.

As Matt and I drive back to the airfield through the rustic West End fishing community (a place one Bahamian described as "the ghetto" — a truly inappropriate description!), I think about how much I still have to learn, how many surprises are in store. Finding one's limits is as rewarding as one's mountaintops.





STEPHEN FRANK

*Far left: Large tube and encrusting sponges on this riotous reef near Freeport almost conceal a two-inch fairy basslet, *Gramma loreto*, swimming toward the photographer. Left: A better look at the same fairy basslet. Below: A flamingo tongue mollusc, *Cyphoma gibbosum*, grazing on the polyps of a purple seafan near Grand Bahama Island.*



We depart Freeport about 5 p.m. for Walker's Cay, about a half-hour flight northwest of Grand Bahama.

NOTES: FLYING TO WALKER'S — Matt, as ever, steady at the stick. We are above The Great Shallow Sea of the Little Bahama Bank. From here the vision of the sea is rare and personal.

Hundreds of miles of open ocean reveal a clearly visible bottom. I might dive a lifetime and never see so much of the ocean floor. Long sand mountain ranges take on surreal shapes. The variety of coloration — emerald, sapphire, gold — is reflective. Since childhood I've had a fantasy that the sea would dry up long enough for me to stroll, hike and climb across its vastness. From 2000 feet the fantasy is partially realized.

It looks so much like dry land only newer, sharper, untouched by terrestrial aging. The mountains look like mountains, and there are marsh-lands, flat and clay-colored; the badlands are only sparsely vegetated and monotonous.

But there is a profound difference: The banks are pocked and cratered like the face of the moon. Blue holes are densely packed together. It's easy to see why the super-race/outer-spacers believe these almost perfectly round openings which fall into the deepest chasms of the sea, are launching tubes for spaceships. I mention this to Matt: "Why not?" he says.

Or perhaps all of this was once a boiling mass before the ice caps melted and washed over the mountain range. The vents might have been frozen in their tracks. There are as many theories as blue holes in the Great Shallow Sea, and it's only natural to come up with all sorts of explanations. Matt later confessed his navigational gear did an unexpected and unexplained 90-degree turn-about, throwing us off course for a time. We just don't know why this happened. Maybe thunderheads were a few miles away and caused some magnetic anomaly. Devil's Trianglers, make note.

continued

SPORT DIVER DESTINATION DATA

BIMINI

GENERAL

Location: 60 miles east of Miami and 120 miles northwest of Nassau
Size: 9 square miles
Topography: a flat island
Climate: subtropical with 40-60 inches of precipitation annually
Population: 3000
Largest town: Alicetown

DIVING

Water temperature: winter 75-85, summer 75-85°F
Visibility: 110-120 feet
Depth of dives: 15-250 feet
Currents: 0-3 knots, vary
Tidal fall: 2 feet
Types of diving: reef, wreck, drift, coral gardens, dropoffs
Skill level: novice, intermediate, advanced
Dives per day: 3
Diving craft: excellent
Sights:

Fish: grouper, snapper, tropical reef fish, stingrays, spotted eagle rays, jack, moray eels

Coral: fire coral, brain coral, stony coral, black coral

Sponges: seafans, seawhips, tube sponges, cup sponges

Restrictions: no spearfishing with scuba

DIVING SERVICES

Instruction available: resort course, open-water certification
Equipment rental: mask, fins, snorkel, weight belt, weight, tank, backpack, regulator
Equipment sales: mask, fins, snorkel
Equipment repair: fair
Camera repair: none
Air: to 5000 psi
Guides: good

DIVERSIONS

Ground transportation: bus, taxi, motorbike
Shopping: fair and reasonable
Restaurants: good and prices vary
Nightlife: good
Other sports: fishing, tennis

JUST IN CASE...

Hospitals: clinic: 374-2210
Police: 347-2144

PLANNING

Diving tours: Bimini Undersea, Box 4960, Ft. L., FL 33338; Highlander IV, Box 2284-S, Ft. L., FL 33335; Seaventure International, Box 1262, Melbourne, FL 32901; Sea Fever Diving Cruises, Box 1335, Key Largo, FL 33303; Tropic Jack, 1120 S.W. 19 Ave., Ft. L., FL 33312

Land tours: See your travel agent

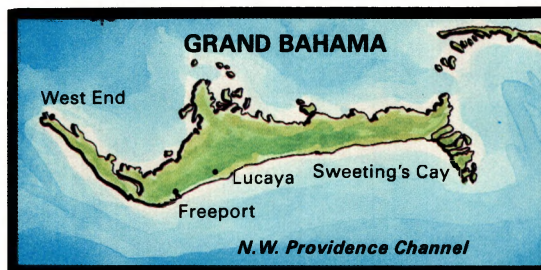
On your own: Airlines: Chalk's MacArthur Cswy., Miami Beach, FL; Mackey International, Fort Lauderdale, Airport, Ft. L., FL

Airports: South Bimini

Marinas: Bimini Big Game Fishing Club, Alicetown, North Bimini; Brown's Hotel, Alicetown; Blue Water, Alicetown; Weech's Dock, Alicetown; Buccaneer Point Club, South Bimini

Accommodations: Bimini Big Game Fishing Club, Alicetown; Compleat Angler; Brown's Hotel, Alicetown, North Bimini

Where a notation "fair," "good," or "excellent" appears after an item, such as guides or diving craft, it refers to the *availability* not the quality of the services.
Information courtesy of Bahamas Ministry of Tourism.



GRAND BAHAMA

GENERAL

Location: 60 miles east of West Palm Bch, FL and 110 miles northwest of Nassau
Size: 530 square miles
Topography: a flat island with sloping beaches
Climate: subtropical with 40-60 inches of precipitation annually
Population: 25,000
Largest towns: Freeport, West End

DIVING

Water temperature: winter 70-75, summer 75-85°F
Visibility: 110-120 feet
Depth of dives: 15-250 feet
Currents: 0-1/2 knots
Tidal fall: 3 feet
Types of diving: reef, wreck, wall, night, cave, dropoffs, coral gardens, blue hole
Skill level: novice, intermediate, advanced, hazardous
Dives per day: 4
Diving craft: excellent
Sights: fire, elkhorn coral; sponges

DIVING SERVICES

Instruction available: resort course, open-water certification, advanced open-water certification, underwater photography, instructor clinics
Equipment rental: full line
Equipment sales: full line
Equipment repair: good
Camera repair: none
Air: to 3500 psi
Guides: excellent

DIVERSIONS

Ground transportation: bus, taxi, rental car, motorbike, bicycle
Shopping: excellent and reasonable
Restaurants: excellent and reasonable
Nightlife: good
Other sports: tennis, golf, gambling, parasailing, water skiing

JUST IN CASE...

Hospitals: Freeport: Rand Memorial, 352-6735; West End: Dial operator
Diving doctors: John Clement, 373-3333; Graham Barry, 352-7288
Police: Freeport: 352-8351; West End: Dial operator

PLANNING

Diving Tours: Froome & Tostevin, Grand Bahama Hotel, West End; Scubahamas, PO Box F-1261, Freeport; Underwater Explorers Society, PO Box F-2433, Freeport; Xanadu Divers, PO Box F-16, Freeport

Land tours: See your travel agent

On your own: Airlines: Mackey International, Ft. L. Airport, Ft. L., FL; Eastern, 4890 N.W. 36 St., Miami, FL; BWIA, 202 S.E. 1st., St., Miami, FL; Bahamasair, 255 Alhambra Cir., Coral Gables, FL; Delta, 201 Alhambra Cir., Coral Gables, FL; International Air Bahamas, Miami, FL

Airports: Freeport International

Marinas: Bell Channel Villas & Marina; Lucayan Beach Hotel & Marina; Running Mon Marina; Blair House Hotel & Marina; Xanadu Hotel & Marina, PO Box F-16, Freeport

Accommodations: See your travel agent

BAHAMAS

Walker's is the northernmost island at the top of the Abaco chain. It is hardly big enough to be an island with a capital "I." You can toss a hardball across it and jog its length in about 11 minutes. Its distinguishing characteristic is a super yachting marina, a big game fishing gold coast. The floating real estate moored there gives faith that not all is lost in the American economy.

Walker's, 45 miles northeast of Grand Bahama, is a place to hunt and kill the big game offshore, a place where crowds gather to see thousands of pounds of barracuda tossed into barrels. To go diving here seems an oddity — a strange and unhealthy practice. American big game fishermen view scuba as do most of the Bahamians and other island peoples.

A Bahamian explained:

"You go fishing and you pull a big fish out of the water and it's got its head only. I look and I say to myself, 'Diving ain't so good a thing to do, man' "

But it's early and the sun is blazing and we're sitting with Mike Hanna, 25, divemaster for Walker's Cay Hotel and Marina. Mike is small, with quick eyes, and I can't help wondering if island fever isn't creeping up on him. The tiny dive shop is next door to a fish slaughterhouse, which is a little like placing the gallows in a church yard. When I see them bringing in live green turtles I feel badly, but then I tell myself I eat turtles, too. On the hill is a church with stained-glass windows.

After a bit of quick maneuvering, Mike gets a Mako and heads for the shallow reefs. The particular spot Mike is looking for was called Sandy's. He marked it with a Clorox bottle, but the rising tide has swallowed it whole, and we search and search in that predatory sun until we find it.

The reef reminds me of Looe Key, off Big Pine in Florida. It isn't a spur-and-groove system, but it has similar coral



Grottoes, caves and overhangs characterize many shallow-water sites just off Walker's Cay.

construction: lots of valleys and small worlds within worlds waiting for us on the other side of the sand flats.

At 45 feet, Freddy makes a few people shots and heads into a miniature Valley of the Dolls. I swim above the coral heads, which extend nearly to the surface in some places, make note of the general construction and find myself a nice cozy little ecosystem and stay pretty much in one spot for an hour or so. Matt, who in addition to being a pilot is also a diver, joins us. Freddy went out again in the afternoon to another shallow reef. Unfortunately, the boat motor quit in the dead of the afternoon torpor, leaving Freddy for nearly three hours, which puts a serious crimp in our quick-quick schedule. It's lucky Freddy is such a salt and loves diving as a sweets junkie loves his Ho-Hos. He'd turned the inconvenience to advantage, burning tank after tank until Mike flagged a passing boat and was taken under tow.

"It was *damned* nice," Freddy says, strong words for this man from New Hampshire.

Matt, who'd been diving the Bahamas for several years, had seen prettier reefs. Sandy's, while it is a delight, doesn't have the drama found in the islands farther west of the Gulf Stream in the society of "Family Islands," where the water is cooler, and the underwater scenery is described by spires, pinnacles, abyssal dropoffs.

The geography of Walker's is almost that of an island-beach, awash on a long, current-sculpted shoal. Coming up out of the shallow Little Bahama Banks, it rises barely above sea-level and to the north drops gently to about ten fathoms before rising up again onto another series of sand shoals.

"No blue water. No blue holes," Mike tells us.

Quite so. Not very fishy either.

However, the *Evangelista* wreck is of special interest. Archaeologists in 1976 uncovered the Spanish treasure ship's remains near Walker's and brought up cannons, anchors, and ceramic artifacts. They say no gold was uncovered. The wreck is an hour or more from Walker's, but it's open to visiting divers in 30 to 35 feet of water.

Mike says Walker's can handle groups of ten divers, and that 200 or so pass through yearly. I suspect most are here to dive and do other things, too. This is by no means a criticism. There are islands which cater only to the hardcore dive crowd, the typical group hoping to burn a hundred tanks and expose several miles of Ektrachrome. But Walker's is a place to fish and relax for a while, and do a little diving.

And it is at Walker's, where the people who work in the hotel are very open and congenial, that I learn a few important facts helpful to anyone visiting this island nation.

continued

It was Noland, the *maitre d'hotel*, who explains how the Bahamian society structured itself following its independence from Great Britain in 1973. If you live in Nassau or Freeport, he explained, it is like an American living in Washington or New York. Nassau and Freeport are the twin pulses of commerce and politics. They are the "in" islands. Bimini calls itself "in" but really it is considered a "Family Island" among the 700 others that made up the chain.

"You know it sounds nice," Noland smiled. He says the much-used term "Out Islands" sounds anti-social. "Family Islands. It brings us together like."

Another Bahamian, older than Noland, calls it "efficient paradise."

We decide then and there to accent the positive. I sum up Walker's underwater world with a few quotes from Freddy:

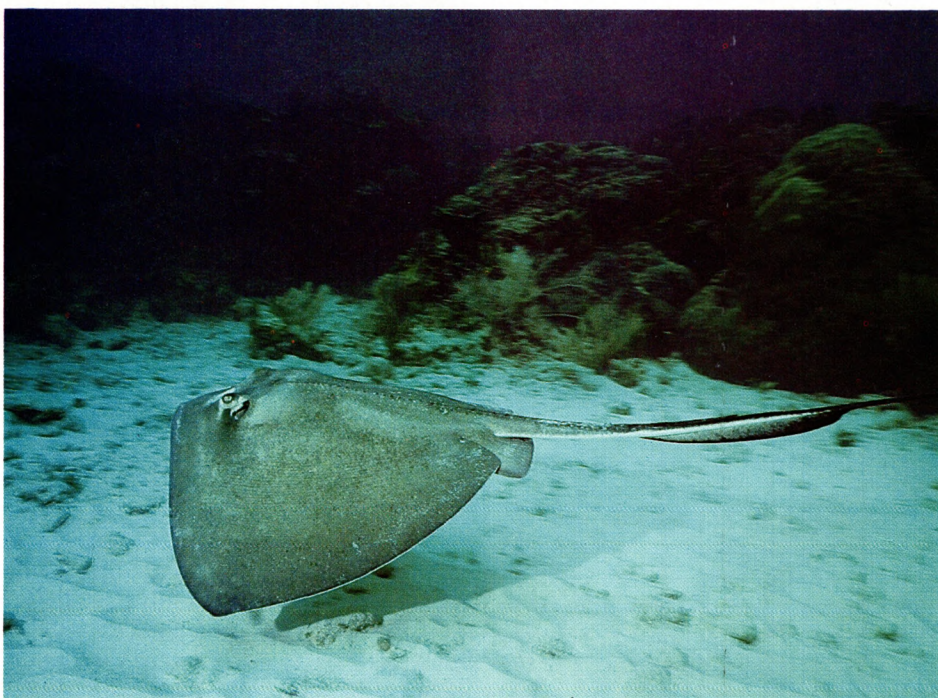
"I found a room (inside the reef). It was the size of a small cottage." He said there was a dark channel which opened at various points along its roof. "It was real *exploring*," he said. "You know, it was a little like spelunking."

It is late. We are behind schedule. But, miraculously, we are in the air before sundown. Walker's disappears quickly in the expanse of the Great Shallow Sea.

We touch down, having come through some bumps and beeper sounds in the cockpit of the Lance. I am a white-knuckler sometimes, but Matt, in his John Wayne way, explains it logically. It's nothing unusual. Not to worry. So I don't.

The sun is just about down when the water taxi arrives to take us to the Abaco Inn near White Sound. We are zonked. Can't wait to wash, eat, sleep. But we cannot know what a wonderful haven we've found.

The Abaco Inn, run by Ruth Maury and Jerry Whiteleather, is beautifully appointed. The food, for my tastes, is



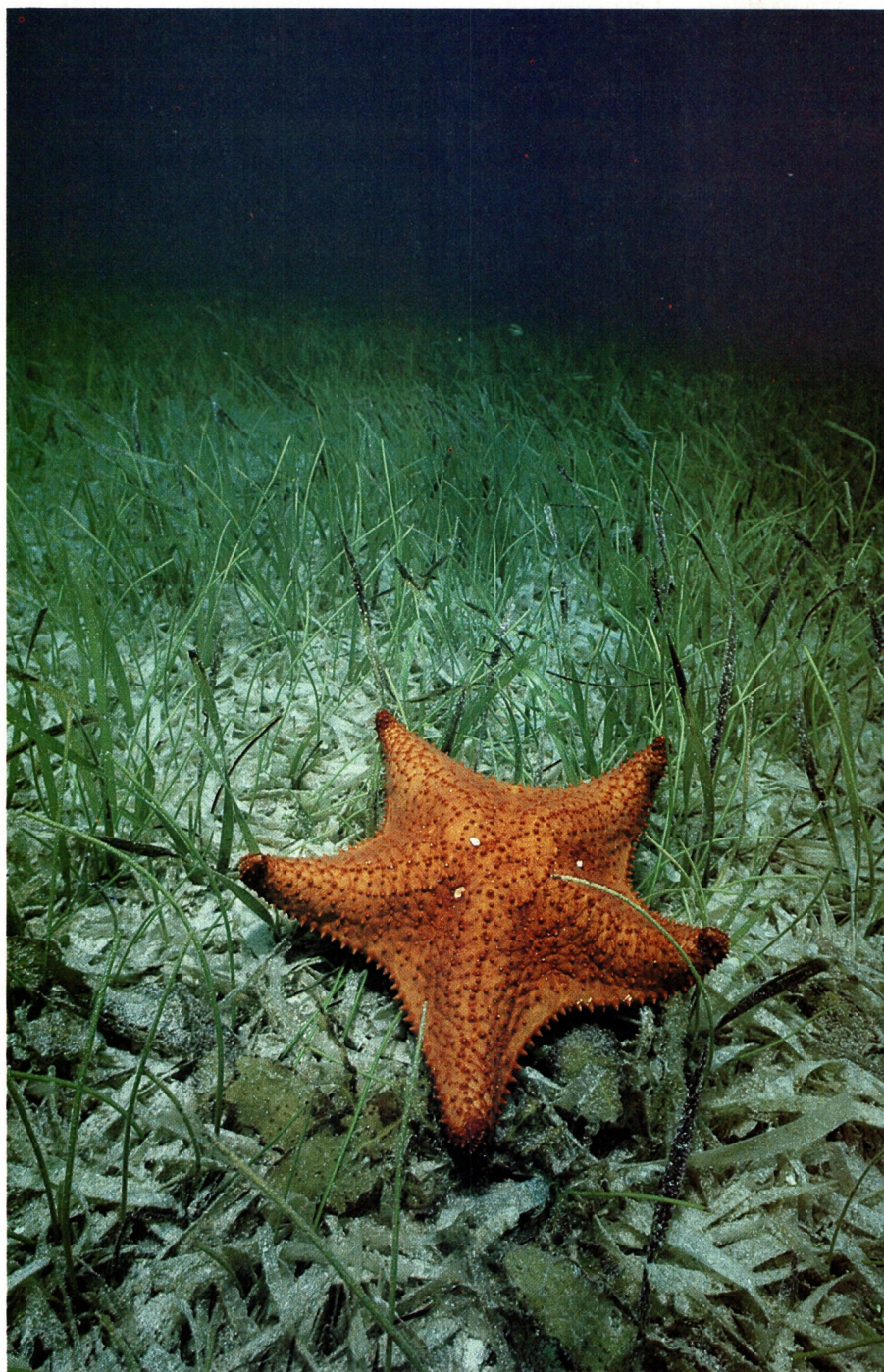
super. How often do you get conch quiche, cheese souffle Ramkin, zucchini nut bread, chocolate peppermint mousse parfait — even when you're not in the tropics. And when ordering a drink, I simply tell Jerry to mix any of his specials. Tropical Black Russians are quite an experience.

The Inn isn't geared to diving exclusively. The groups are small, perhaps four or five, often including Jerry who, at 29, is a former silversmith and has spent over five years in the islands.

We dive with Dave Gale's Island Marine. Dave is another rare gentleman of the tropics. At 48, he's been in the

Bahamas more than two decades. He is an urbane and witty person, also a first-rate divemaster with a clarity of eye that seems to take in everything at once. His operation is nearby Parrot Cay, close to Hope Town harbor, and some years ago he purchased it from the Queen. He has a dozen Boston Whalers, about 50 scuba tanks and a line of rental gear.

We visit a portion of Pelican Cay National Underwater Park, a preserve which takes in about three miles of undersea terrain. We find a wall of coral a half-mile long, coral in excellent condition and near-perfect for macro-photography. The reef rises ten to 20 feet



off the bottom and in many places juts above the surface. It is a thriving, self-contained marine system with a variety of creatures. An excellent shallow dive.

Later, cruising the sand flats Dave spots a manta ray with a six- to eight-foot wing span. Freddy and I grab our masks, fins and snorkels, drop over the gunwale and head toward it as Dave swings in a tight circle attempting to corral the "devil fish" for our cameras.

Having never seen one of these creatures close-up, I swim like mad as the boat circles, bringing the ray within ogling distance. Because we are in water no deeper than ten feet, visibility is

mucky, but sufficient to briefly study the ray's graceful wings and wonder at its great horns, which give it its devilish reputation. These creatures grow to large proportions — some 20 feet or more — and old tales tell of its attacking helpless men and suffocating them with its wings. I consider myself a realist, but I confess these tales are in the back of my mind as we inch closer. I have seen an inordinate number of sharks in open water, and the manta was every bit as impressive. Its power, its fluid form and black hole of a mouth (with crushers rather than razors for teeth) are details of which sea stories are made. It is a rare

Facing page, above: Macro view of a red banded coral shrimp, Stenopus hispidus, foraging in the Pelican Cay Underwater Park shows tentacles of a large sea anemone in the background. Facing page, below: This sting ray, Amphotistius kuhli, was photographed cruising the sand flats near Pelican Cay. Left: A lone West Indian sea star, Oreaster reticulatus, makes its way slowly across fields of sea grasses near Abaco.

privilege to be in the manta's company, even for so brief a time.

Back on the boat Dave is grinning. "Fast," he said. He holds his arms out from his shoulders and imitates the wings of the ray, moving them very slowly. "Just that is about 20 miles an hour," he says.

We move to a string of islets called the Mermaids. In water less than ten feet deep Dave takes us to the fish motel, a scattering of cinder blocks which accidentally fell into the water. We have the impression there are more creatures living at the motel than in any other spot in the Bahamas.

We also dive at night around the Mermaids, with Freddy concentrating on the motel. There are schools of fish, and there are literal nations of them forming a massive wall. Freddy is turned on: "This may be the best dive yet," he says, proving once again that shallow is often more arresting than the deepest walls.

Other good Abaco dive sites include: the *Andirondack* wreck, a civil war gunboat down near the barrier reef near Man-O-War Cay. She is no deeper than 30 feet and reveals two big Dahlgren cannons cast at West Point Foundry; Fowl Cay, just a few miles north of Hopetown, with coral rising 25 feet from the bottom; The Towers, at the center of Fowl Cay Reef, a 70-foot deep hole on the outside portion of the barrier reef. The Towers are actually coral pinnacles nearly 50 feet high and nearly that large in diameter. Staghorn and elkhorn decorate the peaks.

Other sites are at Maxi Cave Bay where there is a large coral ravine about 300 feet long in 20 to 30 feet of water. There's a cave with a huge entrance and slivers of sunlight pour in from the ceiling. Actually, it is more a grotto than a cave, and getting lost isn't a serious consideration here.

Between the mainland of Abaco and Snake Cay is Rouse's Hole. It's about 70 feet wide and easily 200 feet long, with

continued

ledges. It's generally out of the way of weather. Smooth, easy diving.

There are two inland blue holes worth noting: Cornwall, about 30 miles south of nearby Marsh Harbour, and Devil's Hole near Treasure Cay. To the bottom of Cornwall it's about 50 feet where it turns into an oblique passageway which has never been fully penetrated. Visibility in the hole is excellent: 100 feet or more. The Devil's Hole is large in diameter and is said to be in excess of 200 feet deep. At about 50 feet there is a halocline; stalactites hang from the ledges.

Another dive operation at Abaco is Dan Wiltfang's Chambered Nautilus. Dan, at 31, has been diving since 1960 and has been in the Bahamas about four years. At the time of our visit he was preparing to open a new resort at Casuarina Point, opposite Cherokee Cay. Cherokee is reputed to be a stopover for modern pirates.

The new operation will include seven rental homes, some with five bedrooms and three baths. Dan says he'll be handling groups of 30. There will be plenty of rental gear and diving will focus on the rich area known as Winding Bay, maximum depth about 80 feet.

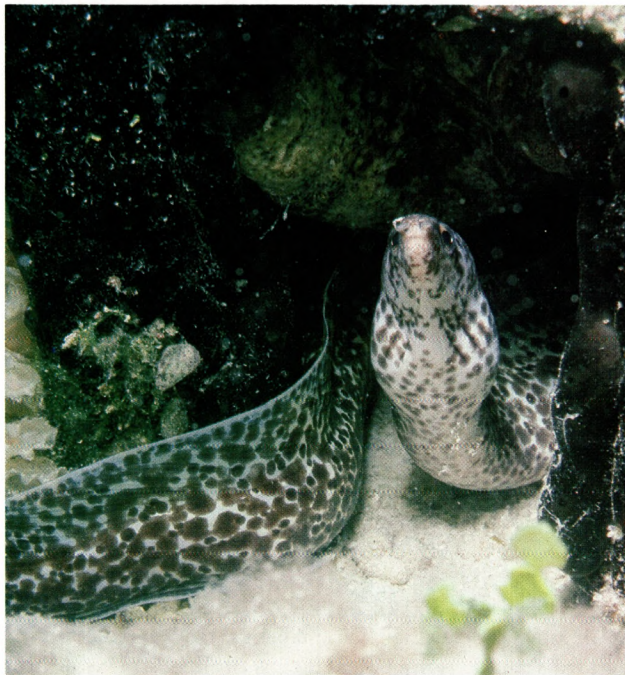
A really innovative touch will be Dan's submarine course. He has plans to purchase two subs, both wet. One will be Perry's *Reef Hunter*. So far as we know, his will be the only sub school for sport divers in the Bahamas.

"Sport diving is naturally going in this direction," Dan tells us.

I recall Nigel Froome's dismay at Grand Bahama. Gear and gadgets lead to more gear and gadgets — and in such a situation can sport subs be far behind?

"They've arrived," Dan says. "Want to give it a go?"

We've been lucky on the weather front, but the Great Shallow Sea is noted for its unpredictable nature. A front moves in — not a nice situation for our little Lance, and Matt decides we'll have to spend an extra evening soaking up the Abaco Inn's barefoot elegance. I'm not about to argue, though the scrubbed flight means we'll miss some good diving in the Berry Islands.



Above: Mike Hanna explores coral overhangs at Sandy's Reef, a shallow site near Walker's Cay. Left: Peering from a coral crevice, a spotted moray, *Gymnothorax moringa*, rises to defend its domain from the photographer.

continued

SPORT DIVER DESTINATION DATA

WALKER'S CAY

GENERAL

Location: 154 miles northeast of Miami and 140 miles north of Nassau
Size: 100 acres
Topography: a flat island
Climate: subtropical
Population: 400

DIVING

Water temperature: winter 75-85, summer 75-85°F
Visibility: 100-110 feet
Depth of dives: 30-60 feet
Currents: 0-½ knots
Tidal fall: 3 feet
Types of diving: reef, wreck, marine preserve, cavern
Skill level: novice, intermediate, advanced
Dives per day: 2
Diving craft: good
Sights:

Fish: grouper, snapper, tropical reef fish, various open water pelagic species, jacks, hatchetfish, coney, squirrelfish, eagle rays, grunt, moray eels, angelfish

Coral: fire coral, brain corals, stony corals, elkhorn, staghorn

Sponges: seafans, seaweeds, tube sponges, cup sponges

DIVING SERVICES

Instruction available: resort course
Equipment rental: mask, fins, snorkel, weight belt, weight, tank, backpack, regulator, safety vest, BC
Equipment sales: none
Equipment repair: none
Camera repair: none
Air: to 3000 psi
Guides: good

DIVERSIONS

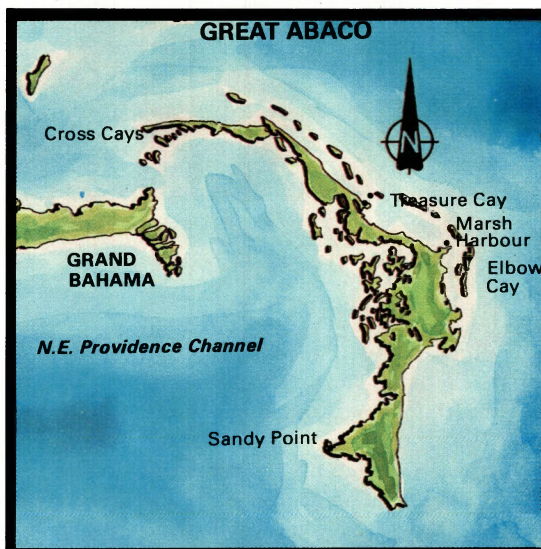
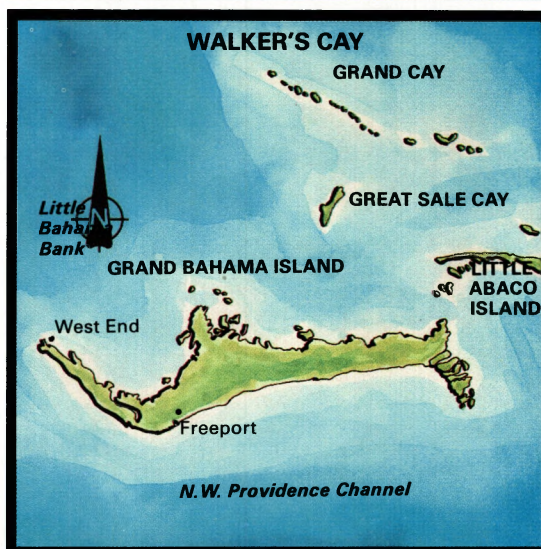
Ground transportation: shuttle bus
Shopping: fair
Restaurants: fair
Nightlife: fair
Other sports: bonefishing, deep sea fishing, tennis, shelling, shuffleboard, sailing

JUST IN CASE...

Police: Call local constable

PLANNING

Diving tours: Omorka Tours, Box 76721, Atlanta, GA 30328, ph: collect 404-428-1588
On your own: Airlines: Walker's Cay Airline
Airports: private strip
Marinas: Walker's Cay Hotel & Marina
Accommodations: Walker's Cay Hotel & Marina



Population: 6000

Largest towns: Treasure Cay, Marsh Harbour

DIVING

Water temperature: winter 75-85, summer 75-85°F
Visibility: 100-110 feet
Depth of dives: 15-130 feet
Currents: vary
Tidal fall: 3 feet
Types of diving: reef, wreck, marine preserve, blue holes
Skill level: novice, intermediate, advanced, hazardous
Dives per day: 2
Diving craft: good
Sights:

Fish: grouper, snapper, tropical reef fish, jacks, hatchetfish, coney, squirrelfish, eagle rays, grunt, moray eels, angelfish

Coral: fire coral, brain coral, stony coral, black coral, elkhorn, staghorn

Sponges: seafans, seaweeds, tube sponges, cup sponges

Shells: cypraea, murex, conch

Invertebrates: nudibranchs, serpulids

Restrictions: no spearfishing with scuba

DIVING SERVICES

Instruction available: resort course
Equipment rental: mask, fins, snorkel, weight belt, weight, tank, backpack, regulator, safety vest, BC, camera
Equipment sales: mask, fins, snorkel, weight belt, weight, safety vest, BC
Equipment repair: fair
Camera repair: none
Air: to 3000 psi
Guides: good

DIVERSIONS

Ground transportation: taxi, water taxi, rental car, motorbike
Shopping: fair and reasonable
Restaurants: good and reasonable
Nightlife: fair
Other sports: sportfishing, golf, tennis

JUST IN CASE...

Hospitals: 367-2320

Police: 367-2560

PLANNING

Diving tours: Dave Gale's Island Marine, Hopetown, Marsh Harbour Airport; Chambered Nautilus, Box 594, Marsh Harbour Airport
Land tours: See your travel agent
On your own: Airlines—Bahamasair, 255 Alhambra Cir., Coral Gables, FL; Mackey Intern'l, Ft. L. Airport, Ft. L., FL; Trans Island Airways, collect, (305) 763-5220.
Airports: Marsh Harbour International, Treasure Cay Airport
Marinas: Conch Inn, Lighthouse Marina, Hopetown; Man-O-War, Cay Harbour; Marsh Harbour, ph: 72022
Accommodations: Abaco Inn, Hopetown, (809) 367-2666; Bluff House; Conch Inn, Box 434, Marsh Harbour, ph: 2800; Elbow Cay Club, Hopetown, (800) 327-0787; Great Abaco Club, Box 445, Marsh Harbour, ph: 367-2158; Green Turtle Club, ph: 367-2572; Guana Harbour Club, ph: Marsh Harbour; Hopetown Harbour Lodge, ph: Hopetown; Mariner's Cove; Treasure Cay Beach Hotel, ph: (305) 444-8381.

ABACO

Location: 200 miles northeast of Miami and 75 miles north of Nassau
Size: 650 square miles
Topography: a flat island
Climate: subtropical with 40-60 inches of precipitation annually

BAHAMAS

Where a notation "fair," "good," or "excellent" appears after an item, such as guides or diving craft, it refers to the *availability* not the quality of the services. Information courtesy of Bahamas Ministry of Tourism.

The Berrys, a fishhook-shaped group of islets between Andros and the Abacos, are not well known as a dive destination. To me, this is an appealing trait and I'll miss the opportunity to see — maybe help name — some virgin sites.

The Chub Cay Club on the southernmost island in the Berry chain is well known among anglers as a fishing resort. The fully equipped marina here is an asset to Don Lehman's new Chub Cay Diver Center, since some fine sites lie within five minutes of the dock. Lehman's operation dives the Tongue of the Ocean dropoff, one of the finest sites in the world, and rivaling the Great Barrier Reef in awe content.

That evening brings an unexpected surprise. While dining at the Abaco Inn's veranda I see what appears to be a huge spotlight rising over the southern horizon and straight into space.

"Rocket! Rocket!" Jerry cries.

A large contrail is forming as the spaceship roars clearly into view. Within a few seconds the second stage fires and the sky is bright with explosions. The spacecraft is many miles away but the extraordinary display carries with it an hallucinogenic impression, and I imagine I can hear the second stage make a whooshing sound.

Everyone is on their feet, cheering. "Go! God, almighty! Go, baby!"

The third stage fires, giving us still another display of fireworks. As the rocket continues on its course we see the expended second stage falling — drifting, really — toward the open sea. It



Brain coral and gorgonia rise 25 feet off the bottom in some formations near Fowl Cay.

glows red as it tumbles through the atmosphere. The payload reaches for the depths of space and after a while it looks like a bright star — disappearing, disappearing, and finally lost in the incomprehensible emptiness.

Dave recalls the Apollo moon rocket days when people came to Abaco to watch from miles around.

"It was very emotional," he says. "Men were in those things."

Later, I am asked by several persons what sort of rocket it was. I didn't know. In fact, no one did. Maybe it was a military rocket. When I called Miami a few days later no one knew about it. A touch of *The Moonraker*.

I wondered how this aerial display would be interpreted by airplane passengers who just happened to be in the right place at the right time. Would they take a realistic view? Or would this be still another unexplained Devil's Triangle mystery?

The 45 minutes or so it takes to fly to Andros is uneventful, and in the early morning sunlight we watch the Shallow Sea going, going — gone — into the abyss they call The Tongue of the Ocean.

For years I've been spellbound by the very idea of it: The Tongue of the Ocean, a 6000-foot rift chasm in the Bahama mountain range. If you are going to be swallowed up, surely this is where it might happen, I tell myself.

I can only imagine how we look to Canadian-born Dick Birch, who with his wife Rosie owns and operates the Small Hope Bay Lodge on the northeast coast of the island. Dick is the one you see in those Andros ads in the magazines playing a piano underwater. I suppose he understands our needs and frenetic pace because within two hours we are heading out to the dropoff.

We are accompanied by divemaster George Fox, lately of the Bahamian cap-



BRUCE NYDEN

*Pumped to maximum inflation, a juvenile porcupinefish, *Diodon hystrix*, makes a grudging acquaintance with a diver near the Andros wall. Inflation is achieved by swallowing water, a defense that erects sharp quills for which the fish is named.*

ital of Nassau, Margo Birch, 25, and "Tuffer" Birch, 14. George remains on board, but Margo is determined to watch after us and see to it that all goes safely. Tuffer will act as a model with me. Perhaps using us in some clever way Freddy will portray the actual mass and impression of depth often missing in underwater dropoff shots. Sometimes I'm of the opinion that underwater photography needs more Elliott Porters and Richard Avedons, photographers who know pictures are impressionistic — not necessarily clinical.

We hit the water. Splash! Deep blue! Clear water poor in the nutrients that cloud the shallows. Seventy-five feet below, the rim of the Tongue of the Ocean is clearly visible. In the distance a big hammerhead eyes us and disappears in the depths.

Freddy was at 100 feet, waiting for Tuffer and me to do our little man/big man routine. At this depth a photo crew

must work quickly. You can only decompress so much, and flying in a small aircraft does terrible things to the tables.

Freddy works quickly. Snap. Snap. Snap. "Go this way! Go that way! Go back and do it again!" It's a bit tiring and air-consuming, and I do want to explore. I can't allow journalism to interfere with my long-standing fantasies.

I swim to a spire which peaks at about 110 feet. I place my hands around it and look down into the abyss. I feel the north-south current along the wall. I stare straight out, then straight down. When I squint I see the black — the onyx diamond of the deep star. I can stare at this phenomenon without a sense of vertigo, because the blackness gives an impression of a bottom, and even if it is 6000 feet below it is less vertiginous than staring straight ahead into the blue where the emptiness defies adjectives. "Swim out there a few yards," I tell myself. I let go of the spire and kick, then

turn to face the wall. I see Margo and Tuffer and Freddy's strobe popping. They are so small; the strobe is a firefly. I swim back to the spire, touch it and head for the anchor line.

"It's the second largest barrier reef in the world," Dick Birch explains later on; the biggest being the Great Barrier Reef of Australia. He tells about a special dive he runs, a dive he insists is perfectly safe. Dick Birch is a pioneer of Bahamas diving, and so I am inclined to believe him.

The dive he describes bottoms out at 185 feet, where there is a deep undercut in the wall. There is a flat sand-covered ledge big enough for a whole crew of divers to stand on. You can peer over the edge and, if you're lucky and it's a good clear day, a prehistoric beach at 300 feet may be visible. During the Ice Age that deep beach was above water, and there may be fossil remains there. Maybe. Nobody's sure, which is par for

continued

the course in these fascinating waters.

However, we couldn't imagine a gang of divers at 185 feet not being somewhat touched by narcosis.

"Well, yes," Dick tells us. Some of them are a little narced, but it's a short no-decompression dive with a safety stop. "Never a mishap," Dick says.

Andros isn't all deep, however. On the inside of the barrier reef are endless shallows. Dick is still very much excited by the exploration as yet undone. Andros is a big island (150 miles long and about 40 miles wide) and there are blue holes and caverns measured in hundreds of fathoms. For a diver, really, it has marvelous variety and it's understandable why Dick brings in a lot of repeat business which has kept him going since 1957.

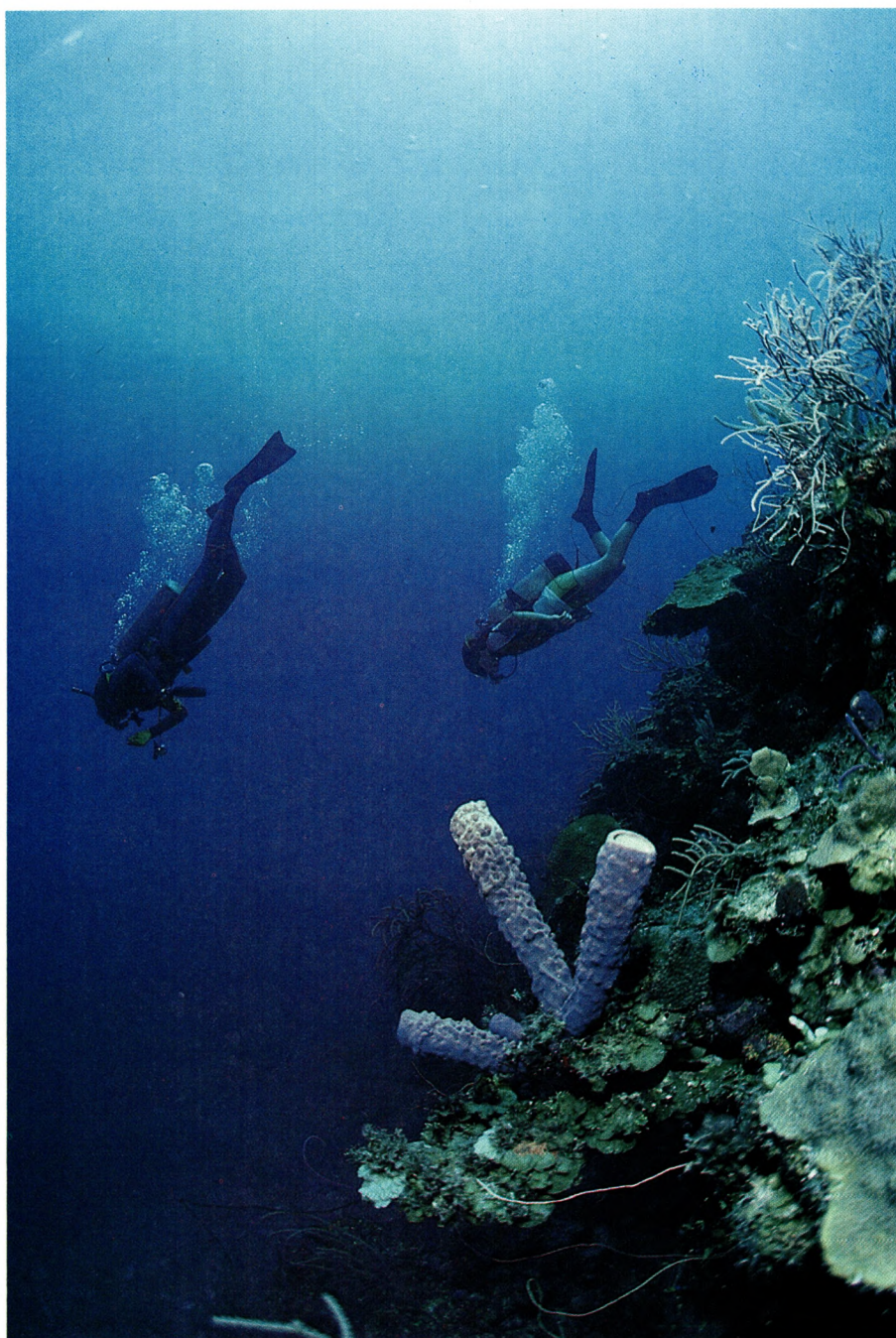
I have an opportunity to speak with Tim Turnbull, a physician and marine biologist who is writing a book on Andros and the sea around it. Tim believes these islands are 150 to 200 million years old, relatively young by the geologic clock. When the North American tectonic plate moved westward a hot spot occurred on the sea floor, what Tim calls a "volcanic thunderstorm," the remains of which formed the base of the Bahama Banks. Everywhere he finds Pleistocene reefs, even in the blue holes.

We asked him about those mysterious holes.

"No one really knows what they are," he says, but he doubts they were vents associated with volcanic activity. Perhaps formed by stresses in the bedrock. "But whatever happened, it happened at least five miles deep," Tim says.

Dick had his own theory: that blue holes were formed by endless rains, hence the terrestrial cave formations found inside them. He suggests they may be channels still being carved by the tides, but channels which took form above sea level.

Perhaps someone strolling the long beaches of Andros will one day hit it and we'll know what blue holes are. Until



Over the edge of the Andros Wall, the world's second largest barrier reef, swim Tuffer Birch and the author. From here, at 100 feet, the wall drops 5900 feet to the ocean floor.

then, your educated guess is worthy of serious attention, even in the closest of academic circles. This is one of the rare opportunities offered by these islands — an opportunity to see, to study, to attempt to put two and two together.

Dick wants to see more Bahamians get into diving. The Family Islanders don't produce too many divers, but Dick has taught the Bahamas' Prime Minister, Lynden O. Pindling, to dive: "He knows his nation is 96 percent water," says Dick, and that's probably why he did it. But what of former Canadian Prime

Minister Pierre Trudeau, who has dived at Andros five times — surely more times than he's visited Studio 54.

"Trudeau's a good man," Dick says, "and a good athlete. He's got the spirit."

Maybe it's the California Hot Tub at the Lodge — the only one in the Bahama Family Islands — or the waterbeds in some of the rooms. Whatever, Dick and Andros create a total water environment, a combination of discovery and personal ease, and an acknowledgement that the continuing growth of the islands rests with the Bahamian peoples.

continued

SPORT DIVER DESTINATION DATA

BERRY ISLANDS

GENERAL

Location: 132 miles east of Miami and 46 miles northwest of Nassau
Size: 380 square miles
Topography: a flat island
Climate: subtropical with 40-60 inches of precipitation annually
Population: 443
Largest towns: Great Harbor Cay, Chub Cay

DIVING

Water temperature: winter 75-85, summer 75-85°F

Visibility: 90-100 feet
Depth of dives: 15-130 feet
Currents: 0-3 knots
Tidal fall: 2 feet
Types of diving: reef, wreck, wall, blue hole, coral gardens, dropoffs
Skill level: novice, intermediate, advanced
Dives per day: 3
Diving craft: fair

Sights:

Fish: grouper, snapper, tropical reef fish, blue marlin, yellowtail, schoolmasters
Coral: brain, fire, elkhorn, staghorn, black
Sponges: seafans, seawhips
Restrictions: no spearfishing on scuba

DIVING SERVICES

Instruction available: none
Equipment rental: mask, fins, snorkel, weight belt, weight, tank, backpack, regulator, safety vest, pressure gauge, depth gauge
Equipment sales: none
Equipment repair: fair
Camera repair: none
Air: to 3000 psi
Guides: good

DIVERSIONS

Ground transportation: taxi, bicycle
Other sports: golf, sportfishing, tennis, sailing, bicycling

Hospitals: Dial operator
Police: Dial operator

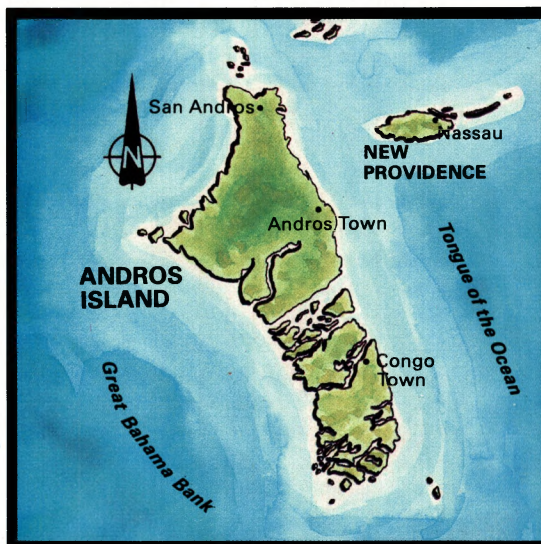
PLANNING

Diving tours: Chub Cay Dive Center, Box 661067, Miami Springs, FL, (809) 325-1490
On your own: Airlines—Bahamasair, 255 Alhambra Cir., Coral Gables, FL
Airports: airstrip
Marinas: Chub Cay Club, Chub Cay, Berry Islands
Accommodations: Chub Cay Club, Chub Cay, Berry Islands, (809) 325-1490; Sugar Beach Club, Great Harbour Cay

ANDROS

GENERAL

Location: 170 miles southeast of Miami and 30 miles west of Nassau
Size: 2300 square miles
Topography: a flat island with sloping beaches
Climate: subtropical with 40-60 inches of precipitation annually
Population: 8845
Largest towns: Nicholls Town, Andros Town, Congotown, Fresh Creek



BAHAMAS

DIVING

Water temperature: winter 75-85, summer 75-85°F

Visibility: 150 feet
Depth of dives: 15-185 feet
Currents: 0-½ knots
Tidal fall: 3 feet
Types of diving: wreck, wall, blue holes, dropoffs, coral gardens
Skill level: novice, intermediate, advanced, hazardous
Dives per day: 4
Diving craft: good
Sights:

Fish: grouper, snapper, tropical reef fish, grunts, jacks, porkfish, blue runners, blue marlin, moray eels, yellowtail, schoolmasters, trumpetfish
Coral: fire coral, brain coral, stony coral, black coral, elkhorn, staghorn, pillar coral
Sponges: seafans, seawhips, tube sponges, cup sponges, basket sponges
Shells: conch, murex, pecten, cypraea
Invertebrates: jellyfish, anemones, nudibranchs

Other: world's second largest barrier reef
Restrictions: no spearing or collecting in area designated as National Park

DIVING SERVICES

Instruction available: resort course
Equipment rental: mask, fins, snorkel, weight belt, weight, tank, backpack, BC, partial wet suit
Equipment sales: none
Equipment repair: fair
Camera repair: none
Air: to 2250 psi
Guides: good

DIVERSIONS

Ground transportation: taxi
Shopping: fair and reasonable
Restaurants: none
Nightlife: fair
Other sports: windsurfing, ping pong, volleyball, sailing, sportfishing

JUST IN CASE...

Hospitals: 328-2038
Police: 328-2626

PLANNING

Diving tours: Small Hope Bay Lodge, Box N-1131, Nassau
Land tours: See your travel agent
On your own: Airlines: Bahamasair, 255 Alhambra Cir., Coral Gables, FL; Holiday Wings, Ft. L., direct charter to Andros Town, Fresh Creek, (800) 327-2514, (305) 463-9130
Airports: San Andros Airport, northern tip; Andros town, center of east coast; Mangrove Cay, east; South Andros, Congotown
Marinas: Andros Beach Hotel & Villas, Nicholls Town, Box 2856-AMF, Miami, FL 33169; Nicholls Town, San Andros Harbour, Mastic Point
Accommodations: Las Palmas, South Andros, Congotown, Box 800, South Andros, (809) 32-82178; Small Hope Bay Lodge, Fresh Creek, Andros Town, Box N-1131, Nassau, (809) 32-82014; San Andros Hotel & Tennis Club, North Andros, (809) 322-1149, 335-8487; Andros Reef Inn, Stafford Creek, Andros

Where a notation "fair," "good," or "excellent" appears after an item, such as guides or diving craft, it refers to the *availability* not the quality of the services. Information courtesy of Bahamas Ministry of Tourism.

A truly international island, the capital of the island nation, shopper's paradise, and from the window of my hotel room the bridge to Paradise Island describes an incandescent rainbow to a world of cafes, casinos, yacht basins and elegant condominiums. On the other side a sign says, "Welcome to Paradise," and there's a toll booth to collect your \$2 entry fee. I had no idea Nirvana had its price.

More than 100,000 people live here — that's four times as many as the next most populous island of Grand Bahama. I can spend lots of time getting to know people, talking politics, indulging my unbeatable system at blackjack. But time is short and we are here to dive.

Thankfully, Freddy is still eager, despite a frightening sunburn and a patchwork of coral cuts. He gathers up his cameras and gear, dons a faded T-shirt and struggles into his homemade neoprene leggings. The ladies on our dive boat put down their copies of *Glamour* and *Cosmopolitan* and stare at him over their initialed Foster Grants. Leggings! Really! But mostly they are here to sun while their children and/or husbands indulge in a bit of underwater sightseeing, mostly in the form of snorkeling. The rest of the divers are fresh from resort courses and take a long time to get into the water.

We dive a shallow patch reef a few miles east of Paradise Island. It lies in five to 25 feet of water and shows the inevitable signs of those hordes of novices who daily walk over, scratch, pick, pluck and generally annoy the bottom and give it a faded ambience. It becomes immediately apparent that if you're going to dive New Providence, it's best to come armed with information on the truly good sites and insist that you be taken to them. In the interests of that tip, here are a few sites worthy of serious attention:

Lost Ocean Hole, five miles east of New Providence and roughly parallel to Rose Island. The opening begins at 40 feet and drops straight down to nearly

200. This is a bell-shaped hole decorated at the rim by large coral heads and alive with big pompano, jacks and an occasional "sleeping" nurse shark.

The LCT wreck, three miles east of Nassau at the eastern tip of Athol Island. This wreck is awash and is sometimes called *Thunderball*. It was the scene of an underwater battle in a James Bond thriller of the same name. It is a haven for marine life.

Gambier, about seven miles west of Nassau. It's a dropoff starting at about 100 feet. There are lots of fish and large, healthy corals. Shlomo Cohen, author of *Bahamas Diver's Guide*, says this site is a "solid biological mass of concentrated diving pleasure." The wall slopes rather than drops straight down to 100 feet, so you can explore with plenty of time at shallower depths.

Clifton Pier Wall, at the southwest corner of New Providence. The wall starts at 80 to 90 feet and disappears into the Tongue of the Ocean.

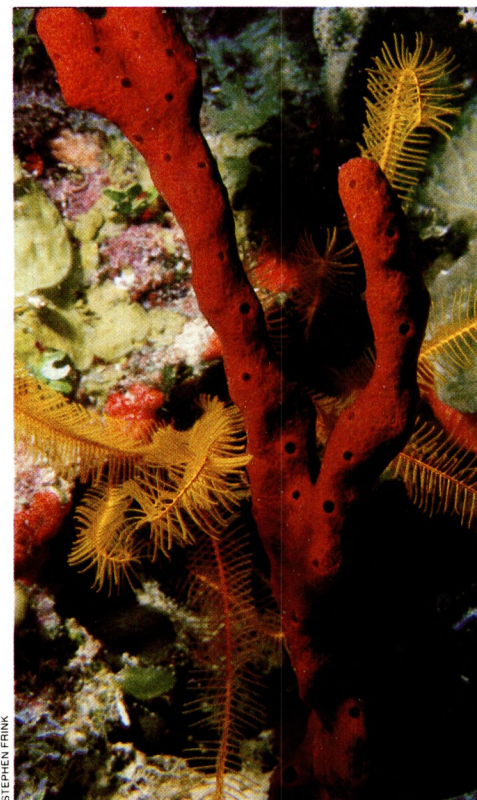
South Reef, at the end of a sandbar which runs from Coral Harbor toward Andros. From shallows, the reef tumbles into the Tongue of the Ocean.

Porpoise Pen Wall, just southwest of Clifton Pier. This is Hollywood's contribution to the waters of Nassau (or at least one of them) and the pens were movie stages for the *Flipper* series and *Day of the Dolphins*.

Lyford Cay, about two miles north and west of Lyford Cay Harbor. This is a lush garden beginning at about 80 feet before going nearly vertical into the Tongue of the Ocean. Lots of sponges, black coral, sea fans, caves. For some reason, the water here is very, very blue (perhaps it's nutrient-poor) and visibility can be extraordinary on an incoming tide when the weather is right.

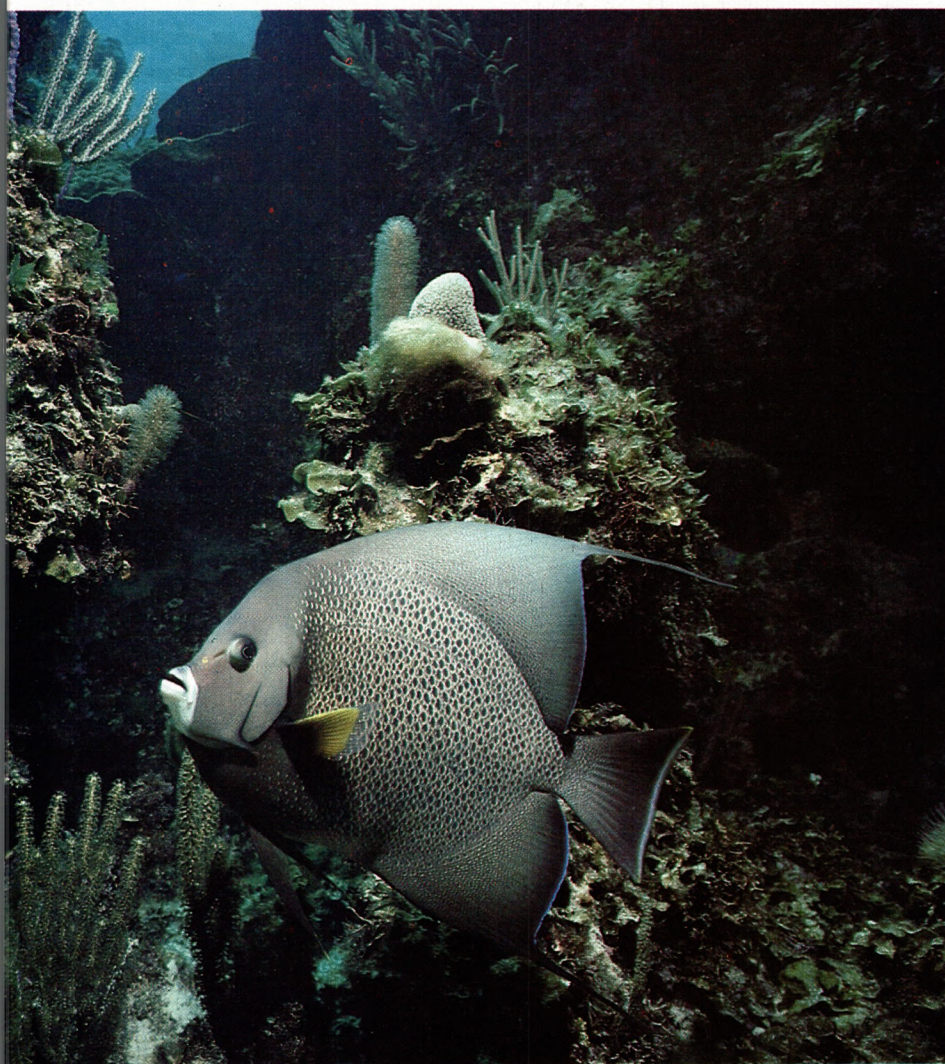
Lambton Wall, about two miles west of Lyford Cay Harbor. Coral heads start at 30 feet on a slope dropping to another level at 40 feet. Divers can swim out farther to a 90-degree wall which drops to a gentler slope at 115 feet.

Mahoney wreck, about a mile west





*Far left: Branching sponge framed by feathery crinoids highlight this colorful reef near Lyford Cay. Left: Tourists find Nassau's handwoven goods among the best buys in the islands, and this roadside marketplace on Paradise Island does a brisk year-round trade. Below: A mature gray angelfish, *Pomacanthus arcuatus*, warily eyes the photographer in shallow water near the Mahoney wreck.*



of Salt Cay. Built in the 1880s, the steel hull yacht has had quite a history and at least four other names. She lies on a sand flat, adorned by gorgonia and sea fans, and has become a haven for tropicals in 30 feet of water. Her boilers are still there. A nice, mellow dive, with good photo possibilities.

This is only a partial list, and there are plenty of sites near Booby Rocks, the Six Shilling Cays and Pimlico Island.

There are plenty of dive boats available (three major operators: Bahama Divers, Underwater Tours Limited, and Nassau Dive Supply) and with a bit of planning Nassau can be a treat.

One thing Nassau does not lack is service — any kind you want, almost any time. It's a bit expensive by island standards; cost of living is close to the States, and in some areas of service it is more expensive. But then one doesn't expect to get by on pennies in such a rich and varied atmosphere.

I take time out to talk politics with 39-year-old Frank Watson, a non-diver who runs Bahama Divers. He is a former deputy comptroller of customs and candidate for a political party known as the Free National Movement, which received 15 percent of the vote in the last election. Frank believes more light industry should be brought to the Bahamas, and that tourism, apparently the hallmark of the current regime, simply can't employ everyone. The kinds of light industry he's talking about will be somehow tourist-oriented, and includes real estate and banking (the Bahamas are a major offshore banking center).

"We're not likely to downplay the tourist," he says, and that means tourists from everywhere. In Nassau, hotel employees take courses in German and French.

"The more people who come and realize the potential here, the more likely it is the Bahamas will continue their upward mobility," Frank says.

When it costs \$2 to enter "Paradise" good times must have touched even the most saintly.

continued

I am with Elsie Symonette, of the Current Club in Eleuthera. She is young, delicately carved, with dark, eyes and a smile that is a mixture of playfulness and shyness. Current Club managers John and Anne Schultz are visiting the States, and Elsie is very busy. She moves with quick steps, saying little but implying a lot. When a Swedish lady complains that her door won't lock, Elsie smiles easily. "It isn't necessary," she says, "but we'll see to it." The lady departs, Elsie looks at me as if to say, *Oh, the rigors of civilization!*

I ask Elsie, a non-diver, what it's like to deal with State-side divers. Again that quick, half-shy smile.

"They come to have a good time. They relax. They drink. Sometimes they are *very* demanding."

But they do know what they want. Elsie says most divers are "nice people, down to earth," and for the most part they're pretty experienced. Not many novices. When big groups visit, the resort has what Elsie calls "Bubble City," 19 suites which sleep two comfortably and a third conveniently.

The next day we meet David Symonette, Elsie's brother-in-law, and divemaster. He tells us the Current Club is open year-round and can handle 25 divers a day.

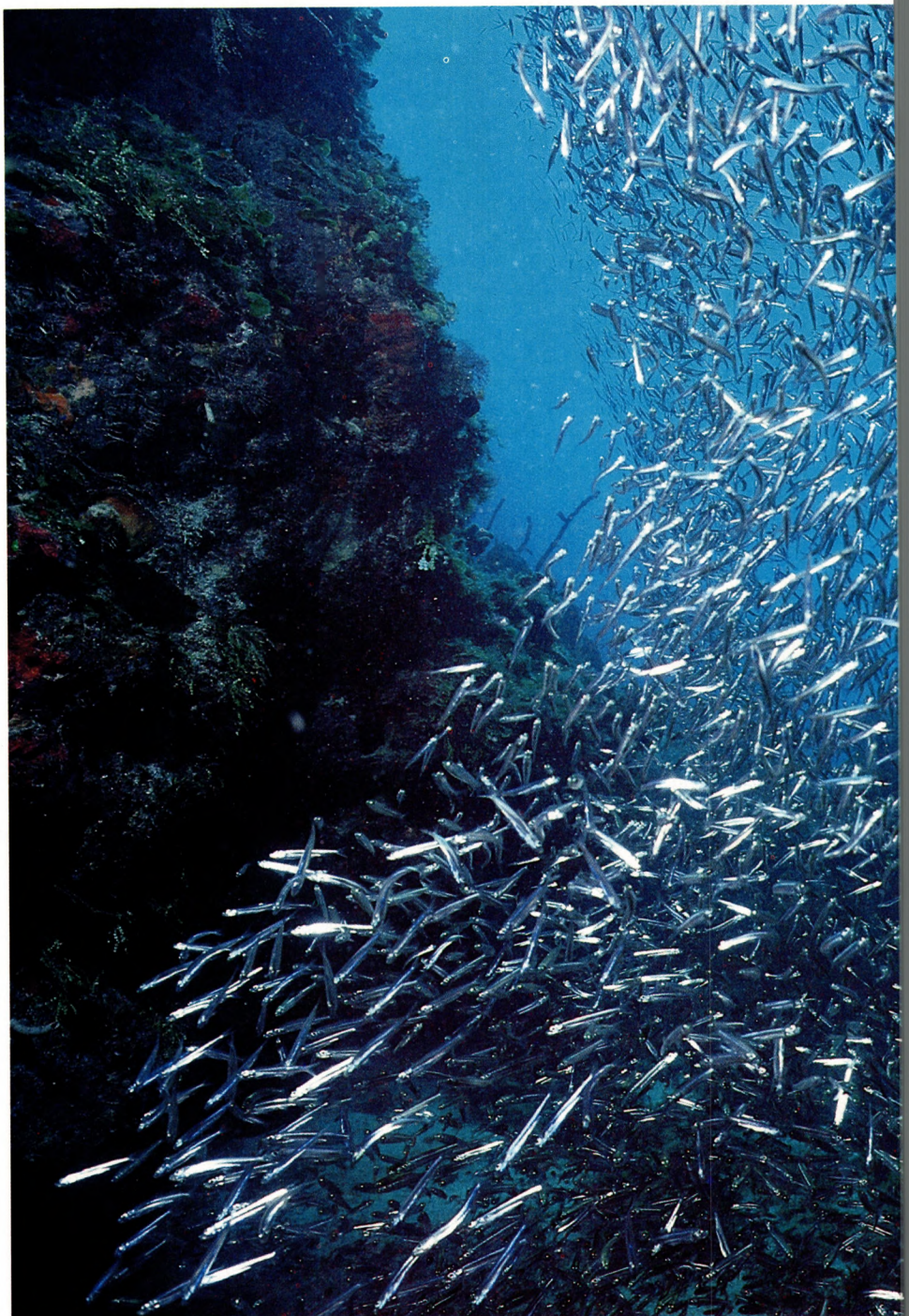
David is a veteran diver, but is rarely down on air these days. There are assistants, often two, and they know the waters, most of it shallow, except for a dropoff on the east side starting at 110 feet. Between the Current Club, Spanish Wells and nearby Harbour Island there is a wide choice of sites. The boredom quotient is close to zero.

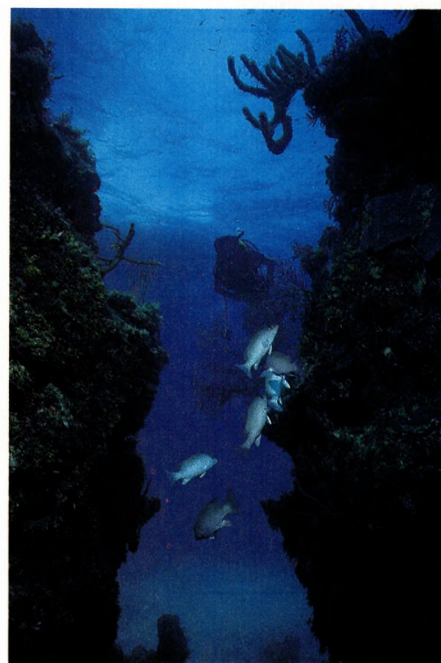
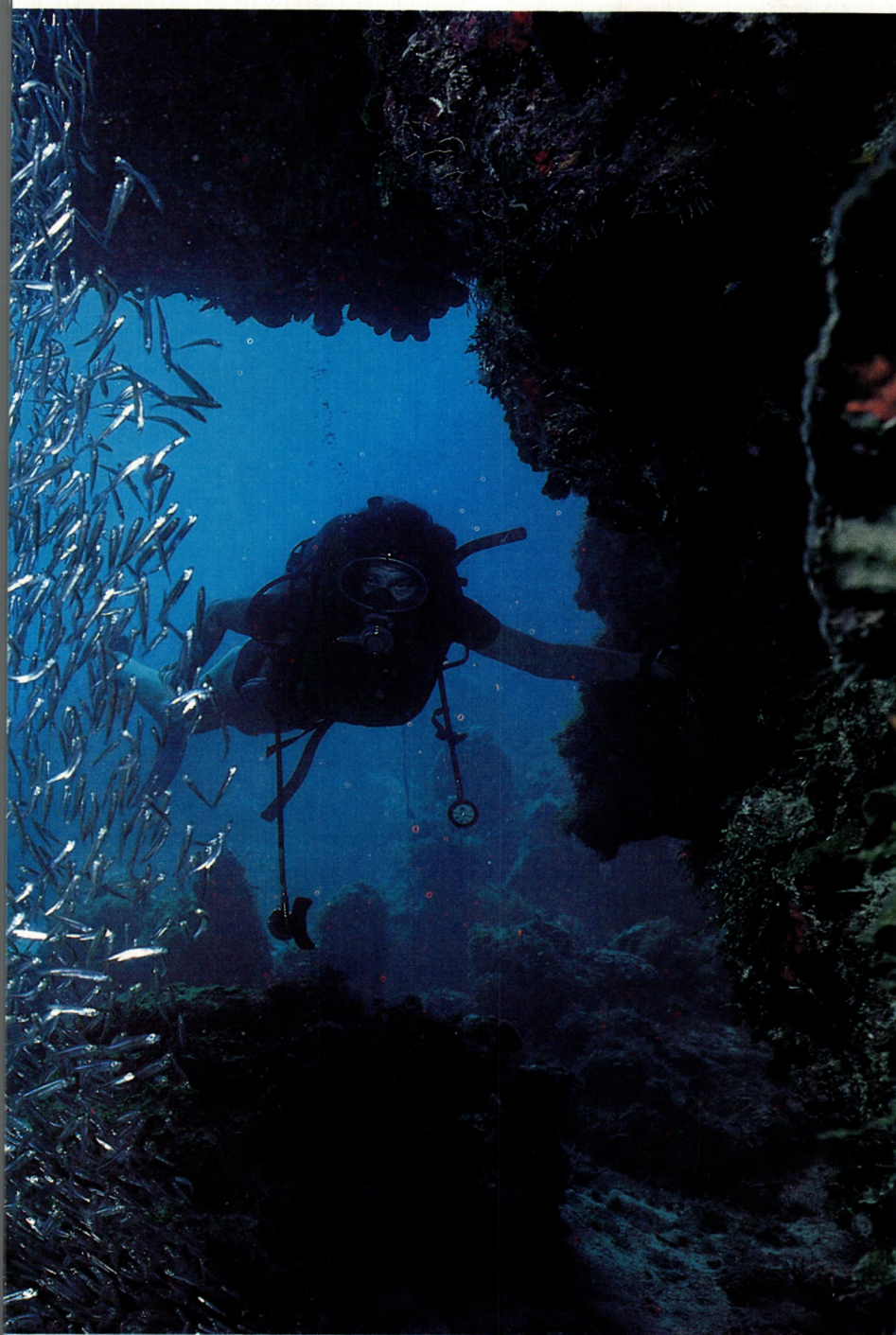
We head out to a site called Split Reef; depth, 45 to 50 feet. It's a series of variegated coral formations rising off the sand 20 to 25 feet, with deeply cut channels. The architecture is arresting: valleys, caves and a truly splendid display of hard corals, gorgonia and big sea fans. Visibility is bright, crisp, extending at

times to 100 feet. And it is a fishy reef, with blue tangs, schools of snappers and grunts. Across the sand flats another formation is waiting, and each might consume days of exploration. Freddy is impressed. "It's the best shooting so far," he tells us.

The Current Club is well known for its Current Cut Ride, a zippy drift through a cut between Current Island and Eleuthera proper. On the approach, white water is clearly visible. Divers go overboard on the in-coming tide and for about ten minutes are completely in the grip of water rushing at six to eight knots. The cut is about 45 feet deep, with

holes dropping to 65 or 70 feet. Current riders are swept to the dock in front of the club where the rushing water subsides. If this turns you on, David will take you out for another drift. Sometimes the cut is peopled by big fish, and the west wall offers particularly good viewing. If you can make photos moving at that speed ("There's no stopping," David says) you may come up with something unique; for instance, a blurred background with an in-focus diver as the subject. So far, that shot — showing swift movement — hasn't been made, and most picture-takers try vainly to hang on long enough to bring back





*Left: The author pauses beneath a coral overhang at Split Reef to watch a school of dwarf herring, *Jenkinsia lamprotaenia*, flash past in search of a zooplankton meal. Above: White grouper, *Mycteroperca cidi*, crowd a narrow coral canyon near Split Reef.*

still another sharp, well-lit clinical representation which says anything but "Current Cut — speed, eight knots."

Other outstanding dives at Current Club include, but are not limited to:

Mystery Reef, a series of large, elegant coral formations in about 50 feet of water. Some are so large they rise to within six feet of the surface.

Fairyland, a shallow reef (25 to 30 feet) patchy and divided by deep sand trenches noted for flocks of tropicals.

Flower Gardens, a two-mile-long continuous reef in 30 feet of water. Appropriately named, with outstanding coral architecture. In some ways similar

to Split Reef — only there is more of it.

High Head, similar to the Three Sisters of Grand Cayman Island. Coral pinnacles rise 25 feet or more off a 50 foot bottom, and the tops are decorated by elkhorn and antler corals.

The Boiling Hole, on the inside of the Current Cut. A hole with upwelling currents and unknown depths.

Incidentally, the famous Devil's Backbone Reef is to the north near Spanish Wells and Harbour Island. It is here that so many full-page magazine ads were born when a large distillery hid a crate of its whisky there and challenged the world to find it. It was found

recently and the finder got to keep the booze. Truth in Advertising lives!

Three dive operations near the north end of Eleuthera make runs out to Devil's Backbone and the more northern sites: Roberts Beach Resort, Romora Bay Club and Valentines Yacht Club. The whisky is gone, but the scenery is exceptional. Wrecks abound near the infamous reef, and there's even an entire railroad train down there, broken up and growing corals.

Roberts, just off the northwest coast of Eleuthera on North Spanish Wells, offers rooms and apartments with kitchenettes and rents boats with outboards

continued

for very little money. Romora is a restored colonial estate fronting the ocean where you can dive right off the beach if you ever become bored with all the wreck sites within minutes of the club. Valentines has a large, modern marina and one of the most well-stocked dive shops in the area.

At noon, Matt is hustling us to the crushed coral airstrip. We lift off into the usual cross-winds, the compass pointing south toward Cape Eleuthera.

Not so long ago, Billie Jean King was the pro here at the Cape Eleuthera Resort. Billie Jean certainly must have enjoyed herself here, because tennis isn't her only vice and the resort offers everything (almost) for just about anybody.

Matt's wife, Lynn, who'd joined us a few days earlier at Nassau, said it best.

"This is a resort. I mean a Re-Sort."

It's a village complex with villas and golf carts to take you around, a self-contained community with its own transportation system, better managed than any I've encountered at home. You get where you need to go, pronto! It's not authentic Family Island, but for a magazine crew in a hurry it's a godsend.

The dive boats are already out for the afternoon when we arrive. But Mr. Hall, the manager, instantly plugs us into the loop.

He talks to big sweet Rosi who is watching the dive shop, and she goes behind the shop and tells a youngster named Rat (he is eating cheese and crackers) to fill up some tanks, cast off the Mako and take us to The Man, Captain Garfield McCartney.

A half-hour later Captain Mac's huge diving craft, *Do-Re-Me*, with its own electric organ, comes into view. They say she's 55 feet long, with lots of girth, and has to be the most well-appointed public dive boat in this hemisphere. As Rat comes astern I see



*On a shallow reef just off Cape Eleuthera, tiny blue chromis, *Chromis cyanea*, pluck passing copepods from a gentle current against a background of elkhorn and star coral.*

the boat towering above us. Rat calls to a bearded Bahamian.

"Hey, we got to see Captain Mac."

The Bahamian gives us a quick look and calls to The Man.

Captain Mac is as big as the *Do-Re-Me*, with tempered power in his deep voice. He looks like a busy man.

I call over that we want a guide, and we want to find the much-publicized World War II underwater sonar cable, which starts at about 65 feet before falling into a 1200 foot abyss.

"Man," he groaned, "We just come from there."

I explain our business, and we certainly don't wish to inconvenience anyone, sir. If you'll give us a man who knows the bottom we'd be most appreciative. Captain Mac brings out the need to be respectful.

A few words from Captain Mac and we are on our way. It is late afternoon and the sun is low. Our guide swears he'll find the cable.

With Rat at the helm, the guide and I are trolled from the diving platform like bait fish. There are some rocky moments and many bubbles, but it is an extraordinary experience.

It is like flying in the Lance, only much closer to the bottom. I don't know how many miles we traveled, going in circles, tracing and tacking. But I was presented with a view of the bottomography that leaves me with the impression that diving presents only a very proscribed world in which even the

modestly large details are never seen.

At last we cross the cable in shallow water. We follow it another hundred yards, and I can see the bottom getting deeper, the details of corals becoming smaller, and the water darkening. By the time we reach the dropoff I have the sensation of skydiving in reverse.

Apparently the cable goes over the wall all the way to the bottom before continuing its secret passage, making it the longest downline in the world. I have read accounts of this cable draping in a semi-circle somewhere on the wall, but at 100 feet it still looks like a straight shot. Visibility is nearly 100 feet horizontally, and more on the vertical.

There is one other dive resort in South Eleuthera, just north of Rock Sound located at the Winding Bay Beach Cottages. The hotel fronts the open Atlantic and has a long picturesque beach.

The diving in the Winding Bay area may not be as dramatic as the Cape, but its many small caves and tunnels can prove just as interesting. Ocean Ledge and Horseshoe Cave are the better spots.

It isn't useful, really, to list all the known dive sites at the Cape. In my single trolling experience (I recommend it!) I continually hollered up to Freddy about shooting this or that spot. I'd given him too much choice. But the bottom *was* rich. And it was varied. I saw some of the fattest parrot fish this side of Molasses Reef, and basket sponges big enough to hide in. On such a journey a Bolex beats a Nikon any day.

continued

NEW PROVIDENCE

GENERAL

Location: 170 miles southeast of Miami
Size: 147 square miles
Topography: a hilly island with sloping beaches
Climate: subtropical with 40-60 inches of precipitation annually
Population: 110,000
Largest towns: capital: Nassau

DIVING

Water temperature: winter 75-85, summer 75-85°F
Visibility: 70-80 feet
Depth of dives: 15-250 feet
Currents: 0-½ knots
Tidal fall: 3 feet
Types of diving: reef, wreck, drift, dropoffs, coral gardens, blue hole
Skill level: novice, intermediate, advanced, hazardous
Dives per day: 2
Diving craft: good
Sights:
Fish: grouper, snapper, tropical reef fish, triggerfish, parrotfish, trumpetfish, blue tang, grunt, queen triggerfish
Coral: fire coral, brain coral, stony coral, black coral, wire, elkhorn
Sponges: seafans, seawhips, tube sponges, cup sponges
Shells: banded coral shrimp, arrowcrabs, lobster, octopus, cleaner shrimp
Restrictions: no spearfishing with scuba

DIVING SERVICES

Instruction available: resort course, open-water certification, advanced open-water certification, instructor clinics
Equipment rental: mask, fins, snorkel, weight belt, weight, tank, backpack
Equipment sales: mask, fins, snorkel, weight belt, weight, tank
Equipment repair: fair
Camera repair: none
Air: to 5000 psi
Guides: excellent

DIVERSIONS

Ground transportation: taxi, rental car, motorbike, bus
Shopping: excellent and reasonable
Restaurants: excellent and reasonable to expensive
Nightlife: excellent
Other sports: golf, parasailing, tennis, sportfishing
Don't Miss: Casino, Blackbeard's Tower, Rawson Square, straw market

JUST IN CASE...

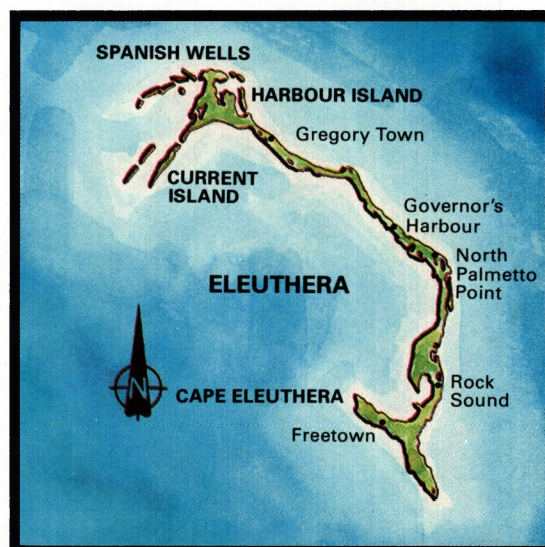
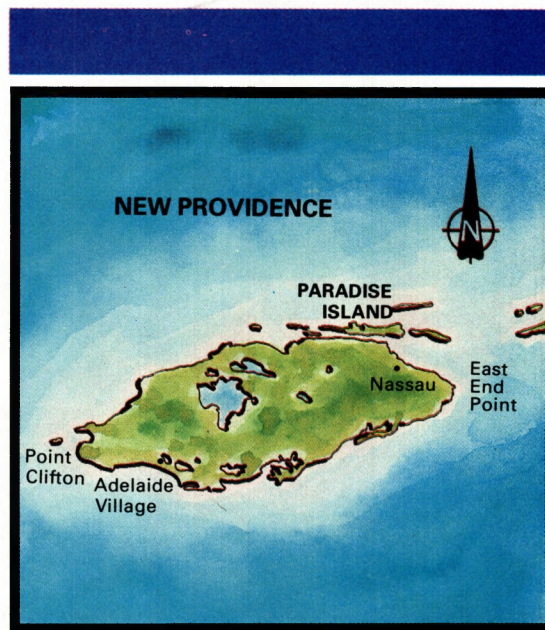
Hospitals: Princess Margaret Hospital, 322-2861
Police: 322-4444

PLANNING

Diving tours: Bahama Diver's Ltd., Box 5004, Nassau; Underwater Tours Ltd., Box 5693, Nassau; Arawak Tours, Box N-7816, Nassau Village, Nassau
Land tours: See your travel agent
On your own: Airlines—Air Florida, 3900 N.W. 79 Ave., Miami, FL; Bahamasair, 255 Alhambra Cir., Coral Gables, FL; Chalk's MacArthur Cswy, Miami Beach, FL; Eastern, 4890 N.W. 36 St., Miami, FL 33148; Air Jamaica, 100 Biscayne Blvd., North Miami, FL 33132; Delta, 201 Alhambra Cir., Coral Gables, FL; American Airlines, (800) 433-7300; Air Canada, (800) 432-3561; British Airways, (800) 432-0444; Lufthansa, (800) 645-3880; International Air Bahamas, (800) 223-5390; Mackey Airlines, (800) 327-2511

Where a notation "fair," "good," or "excellent" appears after an item, such as guides or diving craft, it refers to the *availability* not the quality of the services.
Information courtesy of Bahamas Ministry of Tourism.

SPORT DIVER DESTINATION DATA



BAHAMAS

Airports: Nassau International
Marinas: Mermaid Marina, ph: 52876; East Bay Yacht Basin, ph: 23754; Nassau Yacht Haven, ph: 28173; Bayshore Marina, ph: 28232; Brown's Boat Basin, ph: 31231; Nassau Harbour Club, ph: 31771; Hurricane Hole Marina, ph: 55441
Accommodations: See your travel agent

ELEUTHERA

GENERAL

Location: 50 miles east of Nassau

Size: 164 square miles
Topography: a hilly island with seaside cliffs
Climate: subtropical with 40-60 inches of precipitation annually
Population: 10,000
Largest towns: Harbour Island, Governor Harbour, Rock Sound, Cape Eleuthera

DIVING

Water temperature: winter 75-85, summer 75-85°F
Visibility: 110-120 feet
Depth of dives: 15-130 feet
Currents: 0-6 knots
Tidal fall: 3 feet
Types of diving: reef, wreck, wall, night, drift, coral gardens, dropoffs, blue holes, grottos
Skill level: novice, intermediate, advanced
Dives per day: 3
Diving craft: excellent
Sights:
Fish: grouper, snapper, tropical reef fish, parrotfish, rays, marlin, sailfish, wahoo, dolphin, amberjack, shark, barracuda
Coral: fire coral, brain coral, stony coral, black coral, soft gorgonians
Sponges: seafans, seawhips, tube sponges, cup sponges, basket, vase
Invertebrates: coral shrimp, arrowcrabs, nudibranchs
Restrictions: no spearfishing with scuba

DIVING SERVICES

Instruction available: resort course, open-water certification, advanced open-water certification, underwater photography
Equipment rental: mask, fins, snorkel, weight belt, weight, tank, backpack, regulator, safety vest, BC
Equipment sales: mask, fins, snorkel
Equipment repair: good
Camera repair: none
Air: to 3000 psi
Guides: excellent

DIVERSIONS

Ground transportation: taxi, rental car, motorbike
Shopping: good and reasonable
Restaurants: excellent and reasonable
Nightlife: fair
Other sports: sailing, fishing, golf, tennis
Don't Miss: Cape Lighthouse 80 feet above pink sand beaches, caves

JUST IN CASE...

Hospitals: Governor's Harbor, 332-2774; Harbour Island, 333-2227; Rock Sound, 334-2226; Cape Eleuthera, 334-2152
Police: Governor's Harbor & Harbor Island, 332-2111; Rock Sound, 334-2244; Cape Eleuthera, 334-2152

PLANNING

Diving tours: Cape Eleuthera Resort, Box 528500, Miami, FL 33152; Current Club Hotel, Current, North Eleuthera; Romora Bay Club, Box 146, Harbour Island; Valentine's Yacht Club & Inn, Box 1, Harbour Island; Robert's Beach Resort, Box 31, Spanish Wells; Robert's Harbour Club, Box 31, Spanish Wells; Winding Bay Dive Center, Box 90, Rock Sound, Eleuthera; Islandia, Box 40, Rock Sound.
Land tours: See your travel agent
On your own: Airlines: Mackey International, Ft. L. Airport, Ft. L., FL; Bahamasair, 255 Alhambra Cir., Coral Gables, FL; Air Florida, 3900 N.W. 79 Ave., Miami, FL
Airports: Rock Sound, Governor's Harbour, North Eleuthera
Marinas: Sawyer's Marina on Spanish Wells; Current, (809) 33-32290; Town Dock, Harbour Island; Davis Harbour, The Pond at Hatchet Bay
Accommodations: See your travel agent

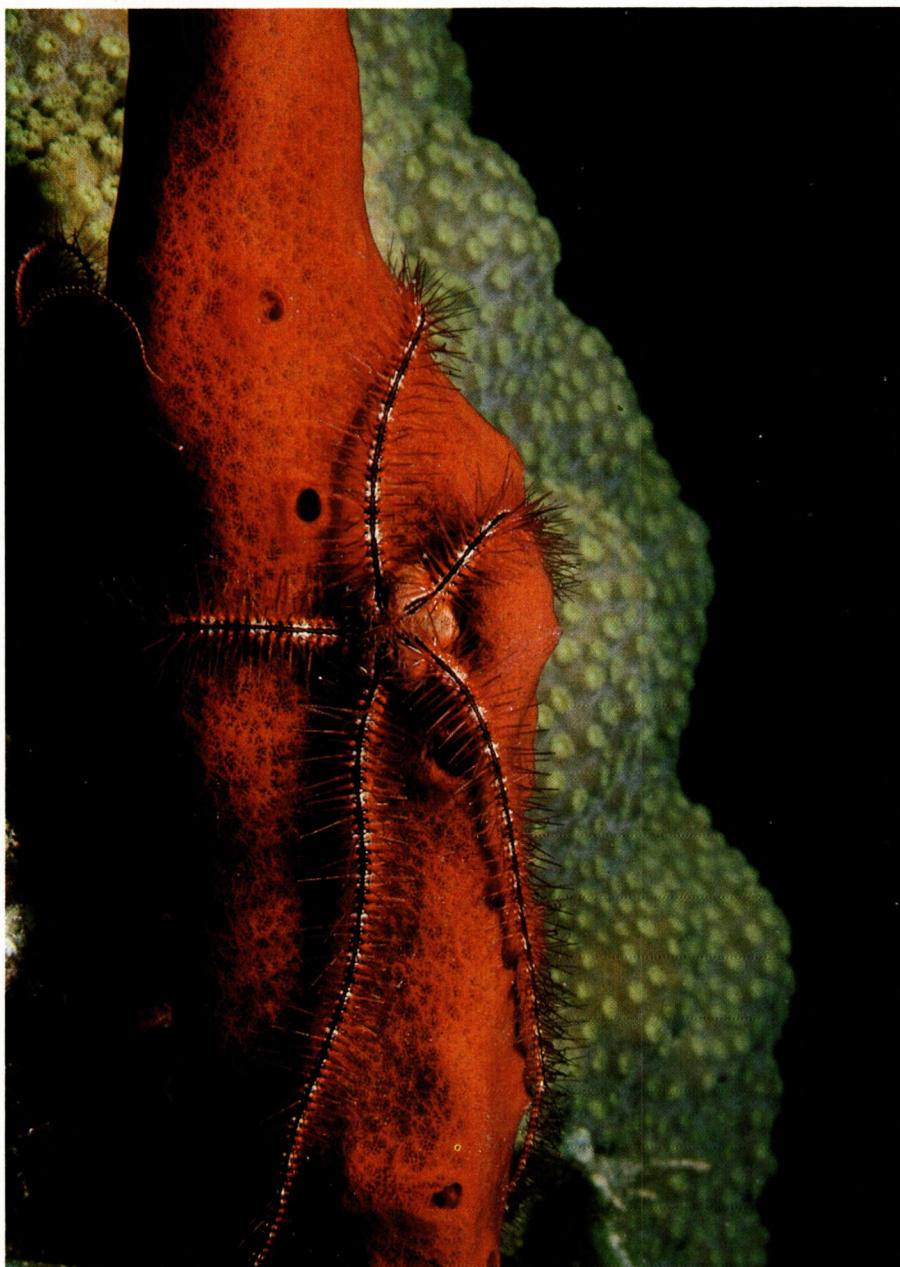
We head southwest into a bright blue sky toward Stella Maris, Long Island, the southernmost point of the journey. Matt says it takes an hour or so at the 160 knots we're making.

From the air the white beaches of Eleuthera flow into the sea like the spires of a crown. The water is transparent, diamond-like; the display of colors is compelling, and it's like the ocean is reflecting so many facets of that wonderful gem stone.

We move into an area of deep ocean. No land in sight. There are big clouds, the halls of the sky continent, and I see a rainbow which drops down out of a cloud and forms a union with the sea. Some time later I notice for the first time during the trip that winds are blowing, that white water was fetching on the dark surface. It occurs to me that Matt is very good, indeed, to venture out here. I notice he still looks calm, no sweat, Jack! I'll bet he learned it from his first instructor on that little grass strip airfield in New Orleans. He's involved with a map and I ask, "Everything okay?" Matt says yes. Freddy is looking over the charts with him. Freddy whistles gaily, the way I did when confronted by a ten-foot barracuda. Lynn is asleep.

I look at my Timex. We're late. I ask again if we're okay and this time Freddy says, "Relax, Phil."

We are into the continent of the sky, and it's all around and dark. Through a break I see white caps way down. But it was so beautiful when we took off. What happened? I know we are slightly off-course (Matt ducks lots of showers), and I know Matt has charts and a compass. But remember what happened near Walker's — that unexplained magnetic anomaly that threw us off? Now it's very clear to me: You don't take flying out here lightly. The sky is like the ocean: different every day. Unpredictable. Matt says flying out here is easier than expected. There are good radio aids and "pilotage," dead-reckoning. But fuel,



Left: In *Stella Maris*, at the narrow northern end of Long Island, blue water is never far away. Below left: A brittle star, *Ophiothrix suensoni*, envelopes a *Haliclona rubens* sponge on this rose coral reef just off Stocking Island. Right: Tubeworms, *Sabellastarte magnifica*, (popularly known as feather dusters) thrust up colorful plumes to strain nutrients from seawater. Below right: Author Trupp investigates an anemone seeming to burst out of an encrusting sponge near Mystery Cave.

which cost us only about \$200 for the trip, must be carefully calculated for over-water flying. Careful is the operative word here, and at a time like this, I understand its value.

We land at South Exuma, about 30 nautical miles east of Long Island.

We take the opportunity to visit Exuma Divers, owned and managed by Wendle McGregor, a native of Andros.

Wendle is out when we arrive and we talk to Burgi Sachse, his assistant. She speaks with a German accent. We speak, *auf Deutsch*, and we are again into diving.

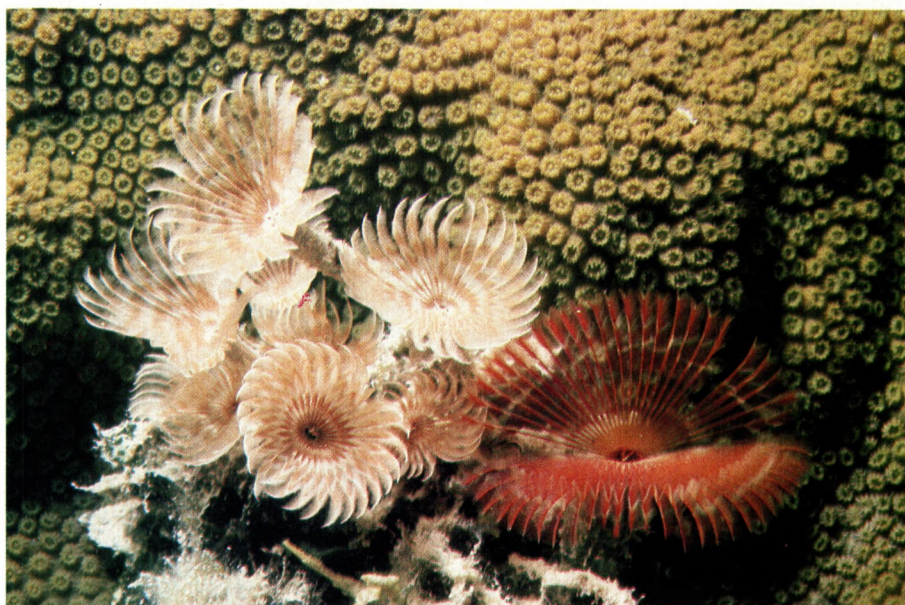
The Exumas are sometimes called the Polynesia of the Bahamas. Lynn loved it. On one side is the Great Bahama Banks and on the other the mile-deep of Exuma Sound. It is territory worthy of a serious diver's attention. They are made up of hundreds of tiny islands; each its own infinite world.

Exuma Divers can handle up to 30, and has three good, sound dive boats. Burgi said they didn't go after walls on a regular basis, but concentrated around an area on Stocking Island called the Mystery Cave.

The ocean blue hole is in a protected lagoon at Stocking Island. The hole begins in shallow water and at about 90 feet goes horizontally beneath the island. And a few yards away from this site is another blue hole 40 feet across in shallow water.

But the Mystery Cave is most compelling. The entrance is about 20 feet wide and 12 feet high. The walls are strangely smooth and covered by orange sponge. The full dimensions remain unknown, but it's been penetrated by a team of experienced divers to about 400 feet. That far back the fish are disoriented and swim upside down, bellies to the ceiling. Lobsters and very large crabs have been seen. There are ocean tropicals and grouper and a good many unidentified species.

Half-way into the tunnel a pile of boulders blocks the way. But it isn't dif-



continued

difficult to navigate and go on — or certainly check air. Mystery Cave obviously will remain a mystery for a long time.

South of Stocking Island between Elizabeth and Guana Cay are shallow reefs and patchy gardens. The shallows near Elizabeth Harbour are fishy.

Because they are so varied, the Exumas offer an excellent opportunity to find new ground. There are at least 25 major diving areas, each of which is surrounded by new bottom. If I had given Freddy too much choice at Cape Eleuthera, Exuma is giving it to me now.

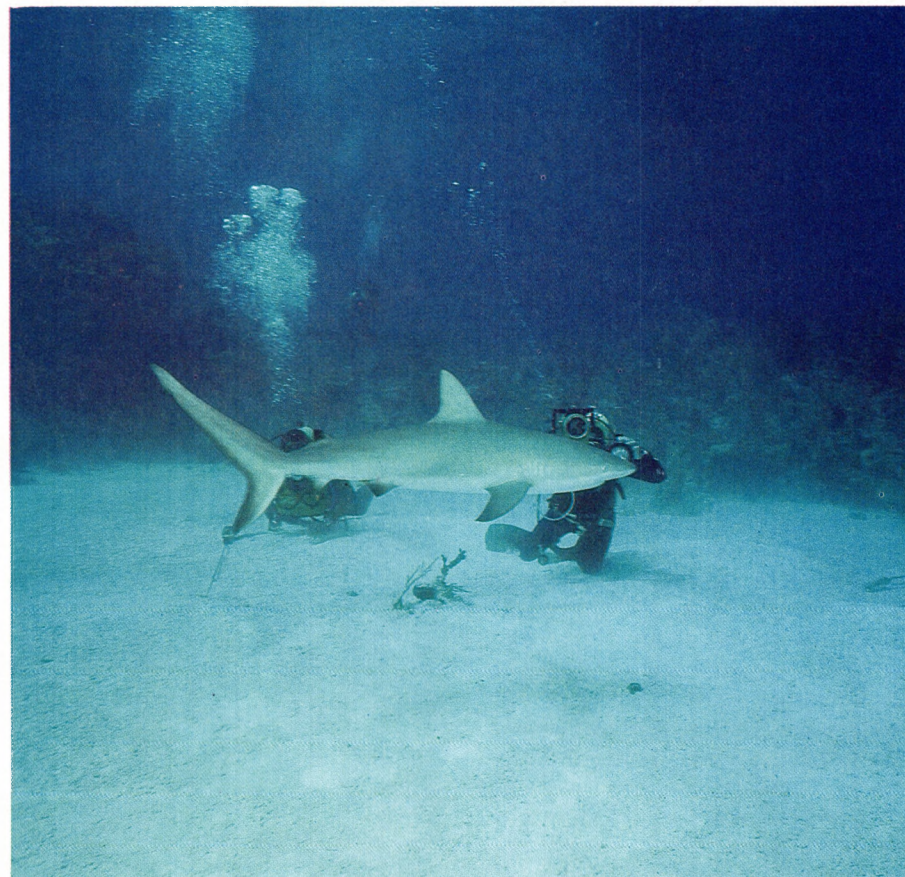
At the Peace and Plenty Hotel or at the Out Island Inn everyone knows about the diving.

"You've just got to get back," a young German diver says.

Apparently. But for now, our brave crew must go forward. Already our tight schedule has aborted a planned stopover at Staniel Cay Yacht Club, a charming and very tiny hotel/yacht/dive operation. Joe Hoher runs a one-man show here, and diving guests are given a boat and a chart and plenty of freedom — a commodity our itinerary has stocked in short supply.

Amazing how many Germans there are in this part of the world. We're *ach du lieber* everywhere in the tropics, and now Peter Kuska is greeting us in perfect English and indulges my attempts to explain our purpose in *hoch Deutsch*.

Peter hands us a well-organized press kit all about Stella Maris Inn and everything it offers down to the last detail. Peter says it's standard literature. It goes to anyone who makes an inquiry about Stella Maris or the Inn's "friendly competitors within the islands," says Peter. The information sheet lists Gerd, Jorg and Peter, "your hosts and dive buddies." At Stella Maris I finally hear an outsider *not* say "Out Island," but use



the new, and more local Family Island.

A much-publicized dive at Stella Maris is Shark Reef. It's just what the name says it is. The Stella Maris Inn/Cape Santa Maria Club info says:

"Heard of SHARK REEF yet? Nothing to be shy of! Yet truly sensational: In 45 feet, just 40 minutes from the harbour, some dozen or so 'conditioned' sharks being fed ... Guaranteed appearances!"

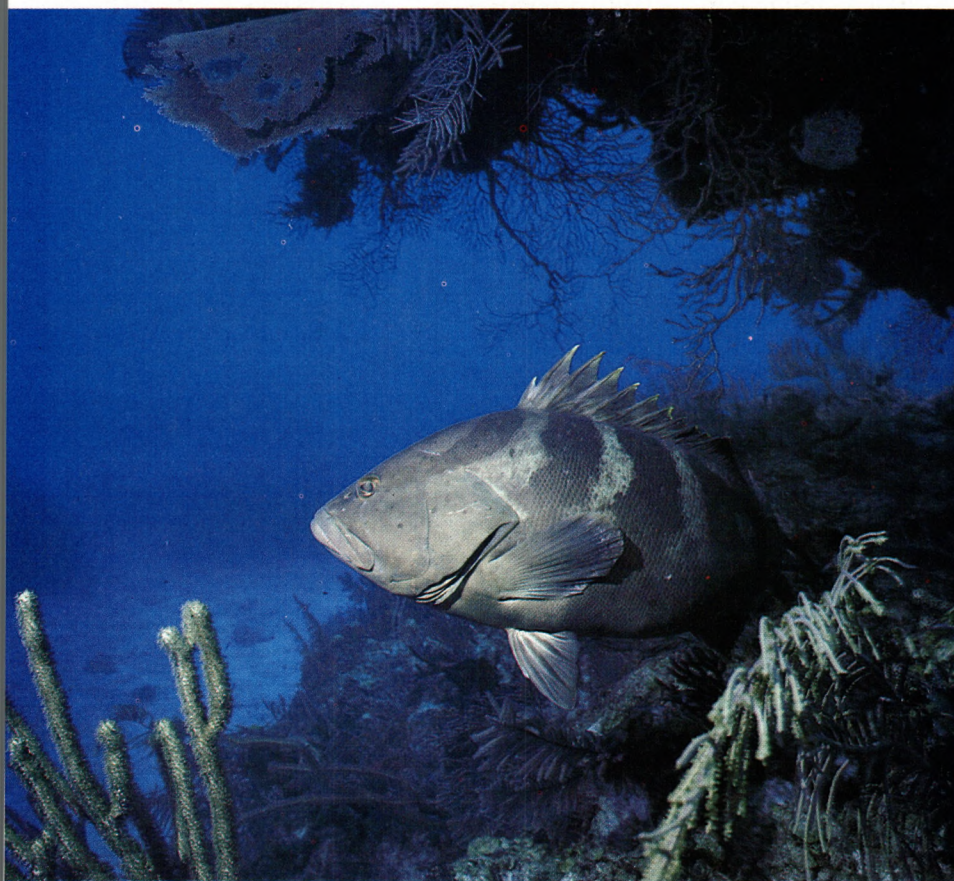
And you are there.

We were, Freddy with his cameras and good guts — and the sharks. As Peter says, guaranteed appearances.

Freddy captured dive guides spearing fish and placing the poles in the sand. The fish were still wriggling.

In a few minutes the sharks come. Divers stand with backs to the coral as they whiz among them, not yet ready to take the bait on the poles. They are bull sharks, flat and gray with pale bellies, about six of them.

After sizing up the divers, the shark goes for the bait. Rip. Rip. It doesn't take long. Open ocean sharks can strip a whale in a few days. Reef sharks tend to be fatter and, barring hammerheads and makos, slightly less hungry. But sharks live in another world in which instinct, blind as fear and stronger than love, is the only force. Its power can't be measured. Imagine the reef, still and empty, except for the fish on the poles. Suddenly the scene changes. The sharks ar-



*Far left: Hearts race and camera shutters fly as reef sharks, *Carcharhinus springeri*, race for bait fish wriggling on poles planted in the sand flats near Shark Reef. Left: A big Nassau grouper, *Epinephelus striatus*, pokes among gorgonia at Grouper Village.*

rive and immediately they dominate like lords. They go for the fish, teeth clicking against the metal poles. It has a hollow, nasty sound to it. The sharks rip at the bait, do a couple of final turns, and vanish. The reef is empty. The poles remain upright in the sand, and the whole thing is like a dream.

"We've never had an accident," Peter tells us.

He says the idea got started two years ago when a German film team visited Stella Maris for a shark shoot. They made good footage but some of the best of it was ruined either in processing or in shipment, and the team had to return. When the film was released in Germany it was a smash, and word of the famous

Shark Reef spread. The Germans got there first, followed by Americans. It's now world famous, and it's more than a gimmick. The dive is a rare opportunity to witness feeding in open water. I recall how everyone said Peter Gimble was crazy to leave his shark cage while shooting *Blue Water White Death*.

Stella Maris also offers tamer fare. There's Long Island Wall starting at 100 feet. It is for experienced divers only, and billed as a "one-time deep dive." Depth depends on experience and desire. Both must be strong.

There's Grouper Village at 30 feet, with coral heads rising half-way to the surface. As the name implies, lots of Nassau grouper are in residence.

Barracuda Heads at 45 feet is a sculptured reef system with many tunnels. Living here are Herby, a large grouper, and Bismark, a relatively relaxed and curious barracuda.

Poseiden's Point is right offshore, a coral shelf which falls straight down to the sand at 45 feet. A mini-wall.

There are reefs as shallow as a few feet, and mid-reefs farther offshore ranging in depth from 50 to 90 feet.

The North Wall starts at 90 and the warm waters have nourished a very rich growth here and, as walls go, it is relatively fishy with visits from the larger pelagics. Southampton Reef is nine miles of continuous coral reef ranging from ten to 100 feet.

Diving is also done at Conception Island, where there's a wall starting at 55 feet on the lee side, and Rum Cay, where the wall is decorated by coral heads rising 30 to 80 feet high from the edge. The dropoff is dramatic and goes straight into the black. In general, the Inn limits depth to 180 — deep by standards in more Americanized islands, where such depths are reserved only for the most seasoned sport divers and professionals. For some reason, Europeans have less fear of what is termed Liability City among American-owned/or operated diving resorts. Perhaps it's because diving started in Europe, and the medium is viewed as somewhat less hostile. For every European diver I know who has made it to 300 feet and beyond on air, I know a dozen Americans who wouldn't dream of it. The Europeans always strive to offer what Peter Kuska calls, "a different kind of experience."

continued

SPORT DIVER DESTINATION DATA

EXUMA

GENERAL

Location: 30 miles southeast of Nassau
Size: 130 square miles
Topography: a hilly island with sloping beaches
Climate: subtropical with 40-60 inches of precipitation annually
Population: 4500
Largest towns: Georgetown, Rolleville, Steventon, Rolletown

DIVING

Water temperature: winter 75-85, summer 75-85°F
Visibility: 110-120 feet
Depth of dives: 15-130 feet
Currents: 0-½ knots
Tidal fall: 3 feet
Types of diving: reef, night, drift, beach, dropoff, coral gardens, blue hole
Skill level: novice, intermediate, advanced, hazardous
Dives per day: 2
Diving craft: good
Sights:

Fish: grouper, snapper, tropical reef fish, eagle rays, amberjacks, horse-eye jacks, turtles, queen angelfish, stingrays, grunt, squirrelfish
Coral: fire coral, brain corals, stony corals, black corals, star coral, gorgonians
Sponges: seafans, seaweeds, tube sponges, cup sponges

DIVING SERVICES

Instruction available: resort course, open-water certification, advanced open-water certification
Equipment rental: mask, fins, snorkel, weight belt, weight, tank, backpack, regulator, safety vest, BC
Equipment sales: mask, fins, snorkel, weight belt, weight, tank, backpack, regulator, safety vest, BC
Equipment repair: fair
Camera repair: none
Air: to 3000 psi
Guides: good

DIVERSIONS

Ground transportation: taxi, motorbike
Shopping: fair and reasonable
Restaurants: good and reasonable
Nightlife: good
Other sports: waterskiing, fishing, tennis, boating

JUST IN CASE...

Hospitals: 326-2666
Police: 326-2666

PLANNING

Diving tours: Staniel Cay Yacht Club, 1760 S.W. 67 Ave., Plantation, FL 33137; Exuma Divers Co., P.O. Box 152, Georgetown, Exuma, Bahamas; Sand Dollar Club, (809) 336-2600
Land tours: See your travel agent
On your own: Airlines: Bahamasair, 255 Alhambra Cir., Coral Gables, FL
Airports: Georgetown, Staniel Cay
Marinas: Highborne Cay, Staniel Cay, ph: 33-42090, Georgetown, Great Exuma, Sampson Cay, The Happy People Marina
Accommodations: Out Island Inn, (809) 336-2171; Peace & Plenty, (809) 336-2551; Pieces of Eight, (809) 336-2600; Sand

Where a notation "fair," "good," or "excellent" appears after an item, such as guides or diving craft, it refers to the *availability* not the quality of the services.
Information courtesy of Bahamas Ministry of Tourism.



BAHAMAS

Dollar Club, Pretty Molly Bay, (809) 336-2522; Staniel Cay Hotel & Marina, (809) 33-42090

LONG ISLAND

GENERAL

Location: 160 miles southeast of Nassau
Size: 230 square miles
Topography: a hilly island with seaside cliffs
Climate: subtropical with 40-60 inches of precipitation annually
Population: 4000
Largest towns: Clarence Town

DIVING

Water temperature: winter 75-85, summer 75-85°F
Visibility: 120-130 feet
Depth of dives: 15-250 feet
Currents: 0-½ knots
Tidal fall: 3 feet
Types of diving: reef, wreck, night, dropoffs, coral head, beach dives
Skill level: novice, intermediate, advanced, hazardous
Dives per day: 3
Diving craft: good
Sights:

Fish: grouper, snapper, tropical reef fish, parrotfish, nurse sharks, blacktips, stingrays, tuna, horse-eye jack, angelfish, barracuda, amberjack
Coral: fire coral, brain coral, stony coral, black coral, gorgonians, elkhorn coral
Sponges: seafans, seaweeds, tube sponges, cup sponges

Restrictions: no spearfishing with scuba

DIVING SERVICES:

Instruction available: resort course
Equipment rental: mask, fins, snorkel, weight belt, weight, tank, backpack, regulator, safety vest, BC, camera
Equipment sales: mask, fins, snorkel
Equipment repair: fair
Camera repair: none
Air: to 2250 psi
Guides: good

DIVERSIONS

Ground transportation: taxi
Shopping: fair and reasonable
Restaurants: fair and reasonable
Nightlife: fair
Other sports: waterskiing, tennis, fishing
Don't Miss: luminous limestone caves

JUST IN CASE...

Hospitals: Dial operator
Police: Clarence Town, dial operator and ask for extension 231; Deadman's Cay, extension 232; Sims, extension 233

PLANNING

Diving tours: Stella Maris Inn, P.O. Box 105, Stella Maris P.O., Long Island
Land tours: See your travel agent
On your own: Airlines: Bahamasair, 255 Alhambra Cir., Coral Gables, FL
Airports: Stella Maris, private; Deadman's Cay, private
Marinas: Stella Maris, Long Island, (809) 027-121
Accommodations: Cape Santa Maria Inn, Long Island; Stella Maris, Long Island, (809) 027-121



DAVE WOODWARD

Above: Huge stands of staghorn coral in shallow water off the east side of San Salvador reach ten to 12 feet in height. Right: This striking photograph, shot off San Salvador near Watling's Wall, shows the anterior part of a juvenile goby, *Ioglossus helenae*, that is scouring the inside of a Nassau grouper's left nostril for the zooplankton on which it feeds.



DAVE WOODWARD

Crooked Island, nearly 100 miles to the south, has recently opened to divers with the establishment of Tom McKay's Pittstown Point Landings. Nearly all the sites here are virgin — McKay began offering Crooked Island dive trips for the first time this year — with the exception of some that were destined to become famous. One of these, Lighthouse Heads, has stands of coral heads so tall they defy the imagination. A private airstrip adjoins the grounds, a nice touch in so small and secluded a resort.

Here our journey ends. Various commitments forced my return to the USA soon after we met with Peter Kuska. Freddy stayed on for awhile; I went with Matt and landed safely and smoothly in Miami.

However, San Salvador was one of our *must* destinations, and fortunately I'd visited there last January. I've stayed in touch with the Riding Rock Inn, and if it's business-as-usual by press time, I'd rate San Salvador near the top of the list in world diving destinations, including the Bahamas.

We visited in January to dive with Dave Woodward, who is running his own photo school there, and with Dee Scarr (a well known underwater cover girl). It was excellent company, and I was very excited by the diving. I burned a lot of air over a period of a week, and I realize my impressions of that island must be stronger than those I hold for the islands we whizzed through. Still — given every consideration — I can say I would return to San Salvador anytime if diving were my only passion. It isn't Cape Eleuthera or Freeport or Nassau; it's Family Island; a get-away.

Underwater is always exotic, but at

continued

San Salvador, 350 miles from Ft. Lauderdale, the coral begins to remind a visitor of the larger southern reefs below the Tropic of Cancer. Cayman Brac, for example, looks a lot like San Salvador on the bottom. This is to compare one lovely form to another equally engaging one: It's simply a matter of taste.

I like large, striking coral architecture; forms and divisions that conjure images. San Salvador has it.

The water is chilly by Bahamian standards: about 72 degrees. But it's very clear, and average visibility was consistently good on deep dives. I was impressed by the gemstone reflectiveness of the water, the way it enhanced color, even below 15 feet. The bottom was alive with the sun, and most days I hung on the wall between 60 and 100 feet and wondered at the black star of the abyss. Here, at San Salvador, Freddy would have seen it clearly, and somehow he'd have made a celluloid image of it. But no matter how true that photo might have been, the full dimension of the experience is primary — one's place in space, the position relative to the powers of the sea.

Here are notes from my dive log, dated January 28, 1979-February 1, 1979.

"East side wall: Virgin area. They generally dive on the west side, but wind is up. Wonderful water clarity, maybe 150 straight ahead. Massive coral formations....

"Same wall. Depth 50. I see more now. The coral is so intricate and it invites me to imagine this is an incredible artifact, a museum of living form... Nature makes us relate its forms and color to man-made objects. That's the trick of the reefs of San Salvador. Photographers, prepare to be *moody*.

"Shallow reef, east side: ...Most massive elkhorn I've ever seen. Had no idea it grew so big. Estimated height, ten to 12 feet. Branches so large they groan under their own weight. Some have fallen to the sand and look like abandoned ship's masts.



*This closeup view of the *Phymanthus crucifer* anemone, shot at 25 feet in the Rose Garden, shows the tentacles of some oral disks fully extended and others in various degrees of retraction.*



"Watling's Wall, depth 100: Exceptional visibility — Wall is bathed in sunlight. It reflects on a sandy ledge at 200 — Peaceful — Dreamlike — the ledge says, 'Come visit.'

"Watling's Wall, depth 50: Remarkably large formations, lots of life, big sponges. It's unusual to see such lush growth. It is jungle-like.

"Blow Hole, east end: depth 120: I come to a formation that rises in two great sections to form an inverted 'V.' I stand there on a sandy semi-circle of bottom, edges of which are gently scalloped; peak of the formation rises 60 feet toward the surface. Straight ahead is blue emptiness. I swim through the 'V' and drop over the wall on the other side.

"The Rose Garden, eastern tip of San Salvador; depth 20: Combination of form and color here, a meticulous symmetry. I'd call it Oriental Rose Garden... The mix of mass and micro is perfect — I'm hooked.

"Furnaces, depth 110: I fall, arms and legs spread, through a deep tear in the cliff face. Turn on my back, slide backwards away from time. Sea whips flutter as I fall.

"Chimneys, depth 50: More extraordinary each day. I am in a city of living coral and fish. Shall I turn down this avenue, follow this road to the gardens — or swim to the top of a skyscraper? This makes the undersea world human, this quality of identification with caverns, castles, moats and lookout towers. Maybe a dragon."

My log goes on, adding only details.

I flew out of San Salvador 4:30 p.m., February 1, 1979, seated in a card chair at the rear of a twin Beechcraft. Three or four big outboard engines were lashed to the deck. It was dark when we touched down at Ft. Lauderdale more than three hours later. It was a cold, rocky ride, and my companion said I looked pale.

Matt might have been dismayed. But Freddy, I trust, would have snapped the picture.

continued

Flying the Bahamas: A Pilot's View



RICHARD STEWART

Island-hopping the Bahamas was a lot easier than this novice over-water pilot thought it would be. Once the psychological qualms of imminent engine failure subsided, flying was extremely enjoyable and satisfying.

Nearly all the Bahamas' tourism ads emphasize the proximity of the islands to each other, and it's true. Your destination will usually be about 20 minutes away with alternates always close by. VHF radio communications are excellent throughout the islands. You can always contact either Miami IFSS or Nassau Radio. Most out-island airports have someone listening in on unicom.

Navigation in the Bahamas is simplified by three VORs; one each on Bimini, Freeport and New Providence. Many out-island airports are equipped with NDB. Due to the usually good weather, you may find yourself just navigating by pilotage. Weather forecasts are good and easily obtained by radio. Winds aloft forecasts are less accurate. On extended legs, pay attention to your heading and time enroute.

Most airports in the Bahamas have hard-surfaced runways at least 3000 feet long. It's a good idea to make a low initial pass over an unattended strip before committing to a landing. Several strips were littered with pieces of light aircraft which had reportedly attempted to land after dark. Flying after dark away from the more developed airports can be a trifle hazardous. Only a handful of airports in the whole Bahamas have lights.

Charts are available for VFR flying. Check the Miami sectional, WAC CH-25 and CJ-26 or the air navigation map distributed by the Bahamas.

Plan fuel consumption carefully, especially if you're going to be in the islands for a while. During our trip, fuel was available only at Marsh Harbor, Rock Sound and Nassau. Fuel availability can change from week to week, and even Nassau has experienced shortages. 100 octane fuel is about 50 cents per gallon higher in the islands. Not all oil company credit cards are accepted.

Maintenance facilities in the out-islands are slim to non-existent. The FBO at Nassau International is the only one able to perform major repairs. It's a good idea for general aviation aircraft to carry a small tool kit, including a tire repair kit and possibly a small electric air pump powered by the cigarette lighter.

File a flight plan. It's added insurance. If you're departing Nassau, a VFR flight plan is mandatory. IFR flight plans are required anywhere in the Bahamas after sunset. U.S. flight plan sequence is used. Be sure to include type and color of any water survival equipment.

Many FBOs on the southeast coast of Florida can offer advice on flying in the Bahamas, customs procedures and other tips. Most of these FBOs rent water survival gear. Rent a life raft and enough vests to protect your group. Be sure to get a briefing on operation of the equipment.

With your flight plan on file and a weather briefing in hand, you're almost ready to jump across the Gulf Stream. Before departing, obtain three copies of the general declaration from an FBO. Someone there can show you how to fill them out. Completing the forms in advance will save time going through customs when

you arrive. Normal hours for customs in the Bahamas are 9 a.m. to 5:30 p.m. daily. Arrival during those hours will avoid any customs overtime charges.

Upon arrival at a designated airport of entry in the Bahamas, locate the local customs officer and present the general decs to him with any luggage you have aboard. You may be asked to present proof of citizenship. For U.S. citizens, a voter's registration card, photocopy of your birth certificate or passport will do.

If you plan to visit other islands during your trip, inform the officer of your itinerary. You will be given a transire form to fill out listing your destinations. Keep the transire with you as it is your cruising permit while in the islands. At each stop, present the transire to the customs officer when you arrive.

At your last stop before departing the Bahamas, you must surrender the transire form to customs. You will also return the tourist cards issued when you entered and pay a minimal departure head tax.

Be sure to re-enter the U.S. through an airport of entry. Miami International, Ft. Lauderdale International, Opa-Locka and St. Lucie County airports have customs facilities. Be sure to arrive before 5 p.m. or be prepared to make an appointment in advance and pay \$25 per hour overtime charges.

Keep in mind the physiological considerations involved in flying after diving. The general rule is that you must be a D diver (repetitive group designation) before ascending to 5000 feet, but research in this area is incomplete. Be conservative and consult your tables. — Matt Huff

SAN SALVADOR

GENERAL

Location: 200 miles southeast of Nassau
Size: 60 square miles
Topography: a hilly island
Climate: subtropical with 40-60 inches of precipitation annually
Population: 4000
Largest towns: Cockburn Town

DIVING

Water temperature: winter 75-85, summer 75-85°F
Visibility: 120-130 feet
Depth of dives: 15-250 feet
Currents: 0-1/2 knots
Tidal fall: 3 feet
Types of diving: reef, wreck, night, dropoffs, coral gardens, coral heads
Skill level: novice, intermediate, advanced, hazardous
Dives per day: 3
Diving craft: good
Sights:
Fish: grouper, snapper, tropical reef fish, grunt, squirrelfish, barracuda, eagle rays, slipper lobster, yellowspotted stingrays, moray eels
Coral: fire coral, brain corals, stony corals, black corals, hard corals
Sponges: sea fans, seaweeds, tube sponges, cup sponges, barrel sponges
Restrictions: no spearfishing with scuba

DIVING SERVICES

Instruction available: resort course, underwater photography
Equipment rental: mask, fins, snorkel, weight belt, weight, tank, backpack, regulator, safety vest, BC
Equipment sales: mask, fins, snorkel, weight belt, weight, tank, backpack, regulator, safety vest, BC
Equipment repair: good
Camera repair: good
Air: to 2250 psi
Guides: good

DIVERSIONS

Ground transportation: taxi, motorbike
Shopping: fair and reasonable
Restaurants: fair and reasonable
Nightlife: fair
Don't Miss: exact spot where Columbus landed

JUST IN CASE...

Hospitals: Dial operator
Police: Dial operator

PLANNING

Diving tours: Columbus Landings, P.O. Box 1492, Ft. L., FL 33302; Island Divers Ltd., Riding Rock Inn, Cockburn Town
Land tours: See your travel agent
On your own: Airlines: Bahamasair, 255 Alhambra Cir., Coral Gables, FL
Airports: San Salvador
Marinas: none
Accommodations: Riding Rock Inn, Box 1492, Ft. L., FL 33302, (305) 566-7441

CROOKED ISLAND

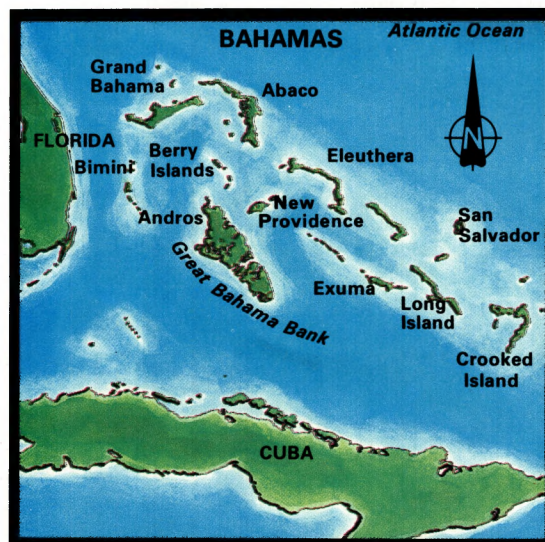
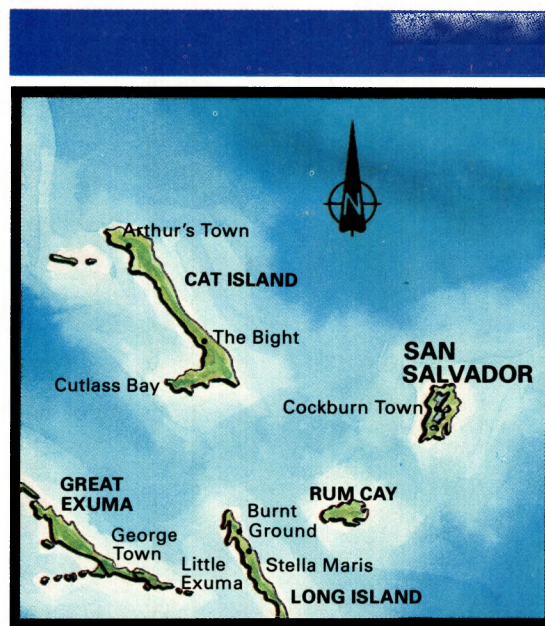
GENERAL

Location: 420 miles southeast of Miami and 240 miles southeast of Nassau
Size: 30x50 miles
Topography: a hilly island with bluffs
Climate: subtropical with 40-60 inches of precipitation annually
Population: N/A
Largest towns: Colonel Hill, Landrail Point

DIVING

Water temperature: winter 75-85, summer 75-85°F
Where a notation "fair," "good," or "excellent" appears after an item, such as guides or diving craft, it refers to the *availability* not the quality of the services.
Information courtesy of Bahamas Ministry of Tourism.

SPORT DIVER DESTINATION DATA



BAHAMAS

Visibility: 100-110 feet
Depth of dives: 15-130 feet
Currents: 0-1/2 knots
Tidal fall: 3 feet
Types of diving: reef, night, dropoffs, coral gardens
Skill level: novice, intermediate, advanced
Dives per day: 2
Diving craft: fair
Sights:
Fish: grouper, snapper, tropical reef fish
Coral: fire, brain, stony, elkhorn, staghorn
Sponges: sea fans, seaweeds, cup sponges, tube sponges
Restrictions: no spearfishing with scuba

DIVING SERVICES

Instruction available: none
Equipment rental: mask, fins, snorkel, tank
Equipment sales: none
Equipment repair: fair
Camera repair: none
Air: to 3000 psi
Guides: fair

DIVERSIONS

Ground transportation: taxi
Restaurants: fair and reasonable
Nightlife: none
Diving tours: Pittstown Point Landing, c/o T&M Associates, 1640 SE 7th St., Ft. L., FL, (305) 467-6850
On your own: Airlines—Bahamasair, 255 Alhambra Cir., Coral Gables, FL
Airports: airstrip
Accommodations: Pittstown Point Landing, Crooked Island

GENERAL INFO

GENERAL

Location: 180 miles southeast of Miami
Size: 100,000 square miles
Language: English
Ethnic composition: 87% black, 13% mixed
Economy: 20% agricultural, 5% industrial, 75% tourism
Monetary unit: One Bahamian dollar = \$1.00
Diving season: year-round
Tourist season: year-round

JUST IN CASE...

Recompression facilities: There is one chamber available in the Bahamas. It is in Freeport, Grand Bahama at the Underwater Explorer's Society, ph: 373-2264, CH 16 VHF
Marine Rescue: Bahamas Air Sea Rescue Association, (BASRA) CH 16 VHF; CH 11 CB; Unicom 122.8
American Express: The only Amex representative in the Bahamas is Play Tours, R.H. Curry & Co., Shirley St., Nassau, Bahamas, (809) 322-2931, 322-2937
U.S. Consulate: American Embassy, William Schwartz, Queen Street, P.O. Box N-8197, Nassau, (809) 322-1181

PLANNING

Campgrounds: Camping is not allowed in the Bahamas
Customs and Immigration: requirements — birth certificate, voter's registration card or passport
Import restrictions: arms, ammunition and mechanical or pneumatic spearguns may not be brought into the Bahamas.
How much cash may you bring into the country? unlimited
Export restrictions: no form of marine life collected in the Bahamas may be exported
U.S. Customs re-entry restrictions: \$300 worth of goods and currency, duty-free
Bibliography: *Bahamas Diver's Guide*, Shlomo Cohen; *Islands of the Bahamas*, Hans Hannau; *Yachtsman's Guide to the Bahamas*, Kline
Bahamas: Fixed Base Operators
Holding Bahamas Charter Certification:
Red Aircraft Service, Walker's Cay Air Terminal, Ft. Lauderdale Airport; Florida Airmotive, Inc., Lantana Airport; Tilford's Aviation Center, Palm Beach Airport
With U.S. Customs:
Fort Lauderdale Airport, St. Lucie County Airport, Miami International Airport, Opa Locka Airport, Palm Beach Airport

ABACO INN/DAVE GALE'S ISLAND MARINE HOPE TOWN, ELBOW CAY

Hope Town, Elbow Cay, Abaco, Bahamas. Phone: (809) 367-2666.

RESERVATIONS: Jerry Whiteleather/Dave Gale, Box Z, Hope Town, Elbow Cay, Abaco, Bahamas. Phone: (809) 367-2666.

LOCATION—Inn is located on ridge overlooking Atlantic Ocean to the east and the Sea of Abaco to the west. 1½ miles south of Hope Town, 5 miles east of Marsh Harbour Airport.

TRANSPORTATION—Air: Trans Island Airways twice daily from Ft. Lauderdale, call collect (305) 763-5220; Bahamasair from Nassau. Private plane facilities available at airport, Abaco Inn UNICOM 122.8 or marine VHF 16. Ground: taxi from airport \$3, ferry boat \$6 to Elbow Cay.

ACCOMMODATIONS—10 rooms in small cottages overlooking the ocean. Each with private bath, air conditioning or ceiling fan and tradewinds breeze. Rates: single \$33-48, double \$43-54. All rates are EP.

DIVING AVAILABLE—

Shallow reef yes	Walls no	Drift dives yes
Mid reef yes	Wrecks yes	Night dives no
Deep reef no	Caverns yes	Beach dives yes

DIVING EQUIPMENT—3 Mako compressors, 2800 PSI. 40 steel tanks, 72 cu/ft. 2 dive boats include 25' "Reef Runner" and 20' "Blue Runner". Trips limited to 5 divers for comfort and personalized service. Limited retail sales with complete line of rental gear. Rental rates include tank/bac pac \$6/day, regulator/gauge \$6/day, BC \$4/day, weight belt/lead \$11 day, mask/snorkel \$3/day, fins \$2/day.

DIVING SERVICES—NAUI affiliation. One instructor, CPR first aid trained. Resort course \$80, open water certification \$350. Cost half day diving (1 tank) \$25, full day diving (2 tanks) \$40. All scuba gear included in dive rate except wet suit. Boston Whaler and Aquasport rentals. 13' Boston Whaler with 25 hp Evinrude engine, 9 gal. tank, fully equipped \$20/day; 17' Whaler with 70 hp engine, 18 gal. tank, fully equipped \$30/day; 19' Aquasport with 135 hp Johnson with power trim, 50 gal. tank, fully equipped \$40/day. Rates do not include gasoline.

DIVING PACKAGES—Daily half day and full day trips to reefs and wrecks of the Abacos and other cays. Write or call above address for complete information and details.

DIVE THE ABACOS

... Where the reefs are still virgin!



Enjoy **ABACO INN'S** leisurely, "away from it all" atmosphere. We'll show you fish and coral —not flippers and bubbles.



ABACO INN

Hopetown, Elbow Cay, Abaco, Bahamas
(809) 367-2666

Barefoot Elegance



ADVENTURE CRUISES— BAHAMA ISLANDS

Hollywood, Florida 33024. Phone: (305) 966-1993.

RESERVATIONS: Adventure Cruises, c/o Linda Deckard, 2720 N. 62 Avenue, Hollywood, FL 33024. Phone: (305) 966-1993.

LOCATION—Boat docked regularly at either Bimini Blue Water Marina or Nassau Harbor Club. Groups met at most convenient location. Cruises to all Bahama Islands.

TRANSPORTATION—Air: Bahamasair and Chalk's Airlines from Miami. For group, Atlantic Coastal Airways from Ft. Lauderdale. Ground: Taxi from airport \$2.

ACCOMMODATIONS—Highland IV, a 60 ft. luxury dive boat designed and skippered by divers, is powered by a twin diesel engine and equipped with full galley, stereo, air conditioning, carpeting throughout, air compressor, three private heads and hot/cold freshwater showers. Boat has yacht accommodations including three double staterooms and one master suite which sleeps four. Sundeck, lounge, Zodiac chase boat, spacious diving platform, autopilot, depthfinder, SSB and auxiliary generator. Master Charge and Visa accepted.

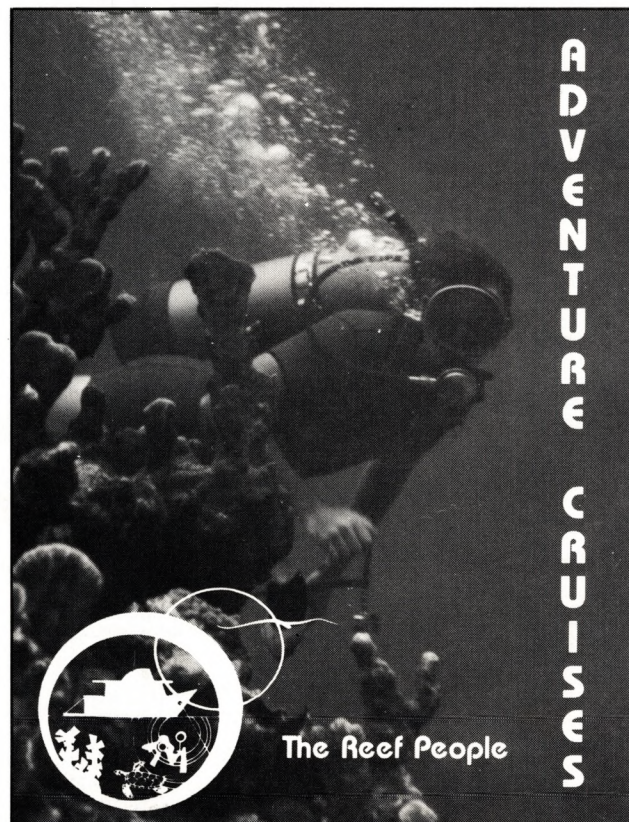
DIVING AVAILABLE—

Shallow reef yes	Walls yes	Drift dives yes
Mid reef yes	Wrecks yes	Night dives yes
Deep reef yes	Caverns yes	Beach dives no

DIVING EQUIPMENT—Mako compressor, 3000 PSI with total air bank capacity of 2000 cu/ft. Twenty 72 cu/ft steel and aluminum tanks. 16' Zodiac chase boat has a total diver capacity of six. No retail sales or rental gear. Tank/bac pac and weight belt/weight included in package. Basic equipment available for emergencies at no charge.

DIVING SERVICES—NAUI, PADI, YMCA affiliation. Underwater photography seminars with Rick Frehsee and blue hole and cave diving seminars with Tom Mount. Marine biology seminars and learn to dive weeks available.

DIVING PACKAGES—7 days/6 nights for \$490 per person. Includes accommodations, three meals daily, unlimited diving, air, tanks, bac pac, weight belt, weight. Commissionable to groups of 10-12. Charters and island cruising arranged to meet individual requirements.



cape
eleuthera,
bahamas



You'll Know How Much You Loved CAPE ELEUTHERA When it Breaks Your Heart to Leave.

TELL ME HOW I CAN BE AN UNDERWATER ADVENTURER
AT CAPE ELEUTHERA.

I AM INTERESTED IN:

- ☐ INDIVIDUAL RATES
- ☐ CERTIFICATION COURSE
- ☐ U/W PHOTOGRAPHY

- ☐ GROUP RATES
- ☐ WALL DIVES

Name _____ Age _____

Address _____

City _____ State _____ Zip _____

Occupation _____ Years diving _____

PLACE
STAMP
HERE



CAPE ELEUTHERA RESORT
201 ALHAMBRA CIRCLE
CORAL GABLES, FLORIDA 33134

CAPE ELEUTHERA RESORT— ELEUTHERA ISLAND

Rock Sound, Eleuthera, Bahamas. Phone: (809) 334-2152.

RESERVATIONS: Sun Country Resorts, 201 Alhambra Circle, Coral Gables, FL 33134. Phone toll free: (800) 372-8776 except FL (800) 432-8251 or (305) 442-7200.

LOCATION—Resort is situated on the beach at Powell Point on the southern end of Eleuthera Island with private airstrip five miles from hotel. 26 miles from Rock Sound Airport.

TRANSPORTATION—Air: Bahamasair from Nassau and Miami, Air Florida from Miami to Rock Sound and Trans Island Airways (charter) from Ft. Lauderdale. Private plane facilities available. Charter flights available through reservations. Ground: taxi from Rock Sound Airport \$10. Bicycle, moped and golf cart rentals available at resort.

ACCOMMODATIONS—125 private air conditioned villas accommodate one to four people each and include bedroom, bathroom, living room, 8-track stereo system and balconies. Hotel and club complex overlooks Exuma Sound and the ocean and has complete resort facilities with private marina and two beaches. Swimming pool, tennis courts and golf course on property. All watersports available including fishing, boating and secluded beaches for private sunbathing. Resort has two restaurants, five bars and nightly entertainment during winter season. Rates: single \$70-97.50, double \$95-135, triple \$130-172.50, quad \$165-210. All rates are MAP, minimum rates summer, maximum rates winter. 15% service charge. American Express, Diners Club, Carte Blanche and Master Charge credit cards are accepted.

DIVING AVAILABLE—

Shallow reef yes	Walls yes	Drift dives yes
Mid reef yes	Wrecks yes	Night dives yes
Deep reef yes	Caverns yes	Beach dives yes

DIVING EQUIPMENT—Worthington compressor, 5000 PSI, 20 cfm. 100 steel and aluminum tanks include 72 cu/ft and 80 cu/ft. Three dive boats include 55' steel double-hulled cruiser, 31' Bertram and 23' Mako for total diver capacity of forty. DO-RE-MI accommodations include three private staterooms, two private heads and freshwater showers, fully carpeted throughout, complete galley, electric organ and two ladder dive platform. Yacht is double decker with several sun bathing spots on upper and lower decks. Two salons on board have stereo with live Calypso band available for groups. Upper and lower decks both have bars. Yacht takes groups on all day island hopping/diving charter. Stopping at several different cays and seafood beach cookout for lunch. Limited retail sales with complete line of rental equipment. Basic gear included in dive rate.

DIVING SERVICES—NAUI, PADI affiliation. Six instructors and two dive masters, CPR first aid trained. Resort course \$19. Full certification and advanced diving courses by arrangement. Underwater photography courses available on request, film in stock. Cost half day diving (1 tank) \$15, full day diving (2 tanks) \$20, (3 tanks) \$30. Tank/bac pac, regulator, mask-fins-snorkel, weight belt, U/V light and boat fare included in dive rate. Special group rates are available on request. Dive sites include the Eleuthera Wall which begins at a depth of 60' and descends vertically to 1200'. Black coral grows on the Wall at depths starting at 80'. Sonar Cable, located one mile southeast of Cape Eleuthera, is a section of the dorp-off marked by a World War II underwater sonar cable which is draped over the Wall and continues down into the depths. Less than ½ mile south of Sonar Cable, a large anchor chain hangs down over the Wall to a depth of 200'. The anchor is imbedded in the top of the coral reef at a depth of 55'. Located inshore from the Anchor Chain is a medium depth coral reef barely 100 yards from shore. Bordered by a flat, sandy area, this reef is a series of coral ridges and high profile heads at an average depth of 35'. The tops of the coral heads are covered with plumes, sea fans and other soft corals. There are many stony corals including brain, lettuce, button coral and star coral. Less than ½ mile inland from the resort are mysterious vertical caverns for the experienced diver only. Some of these blue holes are virtually bottomless, but all teem with salt water marine life. One recently discovered blue hole is actually an extension of a subterranean cave system. The underwater section is complete with stalagmites and stalactites.

DIVING PACKAGES—Several programs available including 8 days/7 nights, 6 days/5 nights, 3 days/2 nights. Call or write for complete details and price list. All rates are per person based on double occupancy and include round trip airfare from Miami, airport transfers, private villa, breakfast and dinner, welcome cocktail and unlimited golf and tennis. Other special packages include honeymoon package, vacation package, and a variety of others. All packages commissionable at 10%. For complete information write to above address.

You'll know how much
you loved Cape Eleuthera
when it breaks your
heart to reach 300p.s.i.



Cape  Bahamas
Eleuthera



Amazing visibility; exhilarating wall dives,
incredible reefs; mammoth caverns, canyons and caves;
spooky blue holes—way down deep, more and
more experts believe that, for quality and variety,
the most spectacular resort in the out-islands
is also the most spectacular Bahamian dive site.

CAPE ELEUTHERA, Bahamas/ 201 Alhambra Circle, Coral Gables, Florida 33134

Tell me how I can be an undersea adventurer at Cape Eleuthera.
I am interested in

☐ Individual Rates ☐ Group Rates SP180

Name

Address

City

State Zip

BAHAMA DIVERS— NEW PROVIDENCE ISLAND

Box 5004, Nassau, New Providence, Bahamas. Phone: 809-322-8431.

RESERVATIONS: Bahama Divers, P.O. Box 5004, Nassau, New Providence, Bahamas. **Hotel reservations:** Bahamas Reservation Service, 255 Alhambra Circle, Suite 435, Coral Gables, Fla. 33134. Phone: 305-443-3821; 800-327-0787 (except Fla. 800-432-5594).

LOCATION—Located in the center of Nassau overlooking Nassau Yacht Haven and the Harbour. 12 miles from Nassau International Airport.

TRANSPORTATION—Air: Air Florida from Ft. Lauderdale, Air Canada from Montreal and Toronto, Bahamasair from Ft. Lauderdale and Miami, Eastern from Atlanta, Miami and New York, Delta from New York. Ground: taxi from airport for \$8, car rentals available.

ACCOMMODATIONS—Over 2900 hotel rooms in the Nassau area offer accommodations ranging from deluxe full-service hotels to small cottages. Bahama Divers is located in the Pilot House Hotel, a small informal hotel with 125 air conditioned rooms and kitchenettes. Pilot House Hotel Rates: single for \$24-29 summer, \$29-38 winter (European plan); double for \$27-33 summer, \$35-42 winter (European plan). Amex and Master Charge credit cards accepted.

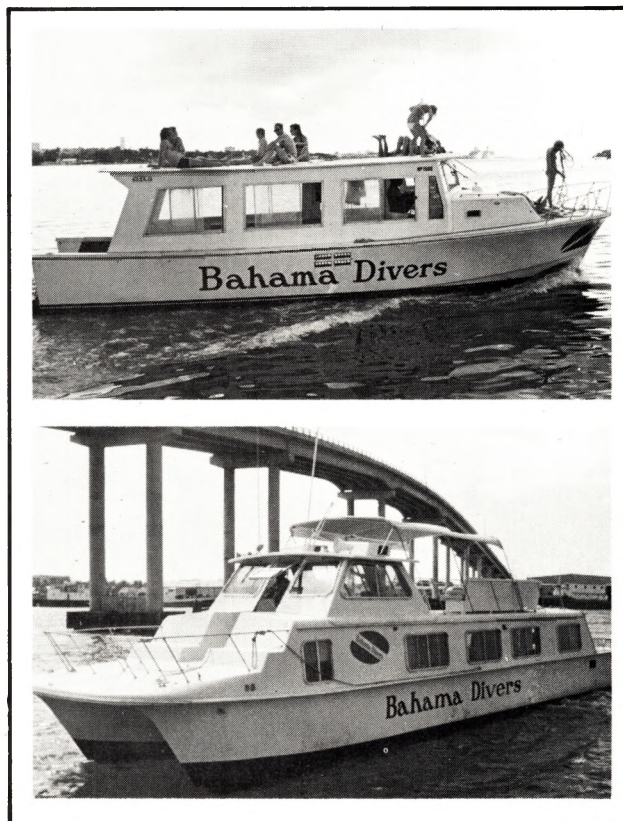
DIVING AVAILABLE—

Shallow reef (5'-33') yes	Walls yes	Drift dives no
Mid reef (33'-66') yes	Wrecks yes	Night dives yes
Deep reef (66'-99') yes	Caverns yes	Beach dives no

DIVING EQUIPMENT—Worthington compressor, 3000 PSI. 40 tanks. 2 dive boats include a 42-ft Custom and a 56-ft Carrycraft. Tank/bac pac, mask/snorkel, wt. belt/lead, regulator included in dive. No photo equipment available.

DIVING SERVICES—PADI affiliation. 1 instructor and 5 dive masters available. Resort course \$28. Full certification and advance diving courses also available. Cost/half-day diving \$25 for 1 dive; full day \$50 for 2 dives; night dive \$25.

DIVING PACKAGES—8 days/7 nights for \$373 single, \$295 double, \$266 triple occupancy. Includes accommodations, two meals per day, airport transfers, tax, gratuities, basic gear and 6 half-day dives. 10% reduction for divers with own regulator.



BIMINI UNDERSEA ADVENTURES— BIMINI ISLAND

Brown's Marina, Bimini, Bahamas. Phone: (305) 763-2188.

RESERVATIONS: Bimini Undersea Adventures, P.O. Box 4960, Ft. Lauderdale, FL 33338. Phone: (305) 763-2188.

LOCATION—Dive shop and boats located at Brown's Marina in North Bimini. Hotel rooms available on both North and South Bimini. 30 minutes from airport which is on South Bimini.

TRANSPORTATION—Air: Chalk's seaplane from Miami. Charter: Atlantic Coastal Airways, Trans Island Airways from Ft. Lauderdale. Ground: Taxi from airport to ferry \$2.50, ferry to North Bimini \$2.50.

ACCOMMODATIONS—Six hotels or inns located on both North and South Bimini. All offer waterfront views and air conditioning with total of one hundred fifteen rooms. Prices range from economy to luxury. Major credit cards accepted.

DIVING AVAILABLE—

Shallow reef yes	Walls yes	Drift dives yes
Mid reef yes	Wrecks yes	Night dives yes
Deep reef yes	Caverns yes	Beach dives no

DIVING EQUIPMENT—Mako and Ingersoll-Rand compressors, 5000 PSI, 10,000 cu/ft storage. Eighty steel 72 cu/ft tanks. Two custom dive boats include 28' with platform and 26' Sportfisherman for total diver capacity of forty. No retail sales. Basic rental gear. Boat rentals available at Brown's Marina for nominal rate. No photo equipment available.

DIVING SERVICES—NAUI and PADI affiliation. No instruction available. No instruction available. Cost half day diving (2 tanks) \$25, full day diving (3 tanks) \$30, night dive \$25. Tank/bac pac, weight belt and weight included in dive rate.

DIVING PACKAGES—8 days/7 nights \$495, 7 days/6 nights \$445, 6 days/5 nights \$390, 5 days/4 nights \$335, 4 days/3 nights \$280, 3 days/2 nights \$225, 2 days/1 night \$165. Includes round trip airfare from Ft. Lauderdale, accommodations (double occupancy), all meals, ground transfers, gratuities, customs, immigration overtime charges, 3 dives per day, tank, bac/pac, weight belt and weights. Deduct \$35 for prices less airfare. Deduct \$10 per person per day for non-divers. 10% commission for groups of four or more, one free with fifteen or more.

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Bimini Undersea Adventures

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Attention Dive Stores
DIVE BIMINI

2 days/1 night (5 dives)	\$165
3 days/2 nights (8 dives)	225
4 days/3 nights (11 dives)	280
5 days/4 nights (14 dives)	335
6 days/5 nights (17 dives)	390
7 days/6 nights (20 dives)	445
8 days/7 nights (23 dives)	495

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P.O. Box 4960, Ft. Lauderdale, FL 33338 • Phone (305) 763-2188

CHUB CAY CLUB— CHUB CAY, BERRY ISLANDS

Chub Cay, Berry Islands, Bahamas. Phone: (305) 445-7830.

RESERVATIONS: Chub Cay Club, P.O. Box 661067, Miami Springs, FL 33166. Phone: (305) 445-7830. Or Bahamas Reservation Service, 255 Alhambra Circle, Suite 435, Coral Gables, FL 33134. Phone: (305) 443-3821; (800) 327-0787 (except Florida (800) 432-5594).

LOCATION—Private membership club, now open to the sport diver, situated on a small private island, the southernmost cay in the Berry Islands chain, at the northern edge of the Tongue of the Ocean. 35 miles northwest of Nassau. 1½ miles from Chub Cay airstrip.

TRANSPORTATION—Air: Bahamasair from Nassau and Miami. Charter: Trans Island Airways from Ft. Lauderdale and Nassau. Ground: Air conditioned courtesy bus meets all flights. Bicycle rentals available.

ACCOMMODATIONS—18 rooms in Yacht Club overlook the marina, 20 rooms in Beach Club overlook pool and ocean, 2- and 3-bedroom villas with private beaches, and a permanently moored 4-bedroom luxury houseboat all have air conditioning and private baths. All villas have kitchenettes, patios and maid service. Rates: double room \$40-60, 2-BR villa \$110-140, 3-BR villa \$140-200, houseboat \$150-210. All rates are EP. American Express, Master Charge, Visa accepted.

DIVING AVAILABLE—

Shallow reef **yes**
Mid reef **yes**
Deep reef **yes**

Walls **yes**
Wrecks **yes**
Caverns **yes**

Drift dives **no**
Night dives **yes**
Beach dives **no**

DIVING EQUIPMENT—Worthington compressor, 5000 PSI. Eighty 80 cu/ft. tanks, 3 dive boat include 26' dual hull flattop, 26' Proline and 36' tri hull flattop. Retail sales available. Wt. belt/lead \$4.50/day, regulator \$7.50/day, mask, fins or snorkel \$1.50 each/day.

DIVING SERVICES—NASDS, PADI affiliation. 2 divemasters available, no instruction. First aid. Bring your own camera and film. Rates: half day (1 tank) \$15, full day (3 tanks) \$35, night dive \$15.

DIVING PACKAGES—8 days/7 nights for \$591-759, 4 days/3 nights for \$366-433, 3 days/2 nights for \$305-355. All rates are MAP and include breakfast and dinner, round trip airfare from Miami, airport transfers, gratuities, taxes and 3 dives per day.



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- beach club or yacht club rooms & villas for groups or families

CHUB CAY CLUB

216 Palermo Ave.
Coral Gables, FL 33134
(305) 445-7830

SCUBAHAMAS/VICTORIA INN— GRAND BAHAMA ISLAND

Freeport/Lucaya, Grand Bahama Island, Bahamas. Phone: (809) 373-3040.

RESERVATIONS: Bahamas Reservation Service, 255 Alhambra Circle, Suite 435, Coral Gables, FL 33134. Phone toll free: (800) 327-0787 except FL (800) 432-5594 or (305) 443-3821.

LOCATION—Located on Midshipman Road in Lucaya. 20 yards from marine, ¼ miles from ocean, 5 miles from airport and casino/bazaar area.

TRANSPORTATION—Air: Bahamasair from Miami and Ft. Lauderdale. Trans Island Airways (charter) from Ft. Lauderdale. Ground: taxi from airport to Inn. Complimentary bus service twice daily.

ACCOMMODATIONS—40 air conditioned rooms, each with private bath overlook freshwater swimming pool. Inn has restaurant, bar and lounge. Waterskiing, fishing, boating, golf and parasailing available. Casino and bazaar shopping. Rates: single \$28 summer, \$42 winter; double \$32 summer, \$48 winter plus tax and maid service. Master Charge and Visa accepted.

DIVING AVAILABLE—

Shallow reef **yes**
Mid reef **yes**
Deep reef **yes**

Walls **yes**
Wrecks **yes**
Caverns **yes**

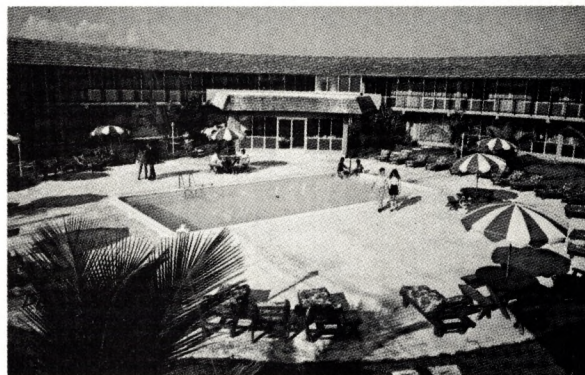
Drift dives **no**
Night dives **yes**
Beach dives **no**

DIVING EQUIPMENT—Ingersoll-Rand compressor, 2500 PSI. Eighty 72 cu/ft tanks. 4 dive boats include 42' Bristol, 32' Prowler, 25' Seacraft and 24' North American for total diver capacity of 50. Full retail sales with basic gear and U/W cameras available for rental.

DIVING SERVICES—NAUI, PADI, YMCA affiliation. 3 instructors and 1 divemaster, CPR first aid trained. Resort course \$20, full certification \$150. Advanced courses including cave diving, decompression diving and underwater photography available. Cost half day diving (1 tank) \$19 or (2 tanks) \$25, night dive \$25 (light included). Tank and weights included in dive rate. 5 dive package available for \$70.

DIVING PACKAGES—"Super Scuba" package for \$25 per person per day (summer) and \$35 per person per day (winter) includes double occupancy accommodations, one tank afternoon dive, tank/bac pac, air, weights and boat.

VICTORIA inn



Scubahamas

SEAVENTURE INTERNATIONAL, INC.— BAHAMA ISLANDS

2280 N. Federal Highway, Boynton Beach, FL 33435. Phone: (305) 723-9312.

RESERVATIONS: Seaventure International, Dan Wagner, P.O. Box 1262, Melbourne, FL 32901. Phone: (305) 723-9312.

LOCATION—Vessel docked at Gulf Street marina on east side of Boynton Beach, north of Palm Beach. 15 minutes from Palm Beach International Airport.

TRANSPORTATION—Air: Eastern, Delta and National Air Lines from Atlanta. Air Florida from major cities in Florida. Ground: major car rentals available. Access routes: marina is located off NE 22nd Ave., accessible from Highway 1 and Interstate 95.

ACCOMMODATIONS—75-ft. long range cruise boat can accommodate twenty-eight divers. Sleeping area fully air conditioned with nine doubles and ten singles. Large dive platform, two chase boats, photo lab, fishing tackle. Specialized charters experienced in Bahama cruises. Available for three to six day dive cruises to Grand Bahama, Abaco, Bimini, Andros, Eleuthera and the Berry Islands. No daily rates.

DIVING AVAILABLE—

Shallow reef yes	Walls yes	Drift dives yes
Mid reef yes	Wrecks yes	Night dives yes
Deep reef yes	Caverns yes	Beach dives no

DIVING EQUIPMENT—Worthington compressor, 5000 PSI. Forty 72 cu/ft tanks. No retail sales. Tank/bac pac, mask, wt. belt/lead, regulator, \$3/day each. U/W camera rental \$10/day. Complete photography lab on board.

DIVING SERVICES—YMCA affiliation. 2 instructors and 1 divemaster. Resort and advanced courses available upon request. U/W photography and spearfishing courses can be arranged. No full/half day dives available.

DIVING PACKAGES—6 days/5 nights for \$348 per person, 5 days/4 nights for \$286 per person, 4 days/3 nights for \$229 per person. Includes 3 meals per day, accommodations, air and unlimited diving. Basic gear available for rental.

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Largest variety of dive sites in the Bahamas.

SMALL HOPE BAY LODGE— ANDROS ISLAND

Fresh Creek, Andros, Bahamas. Phone: (809) 328-2014.

RESERVATIONS: Small Hope Bay Lodge, 270 SW 34 St., Ft. Lauderdale, FL 33315 or P.O. Box N1131, Nassau, Bahamas. Phone toll free: (800) 327-2514 or (809) 328-2014. Or Bahamas Reservation Service, 255 Alhambra Circle, Suite 435, Coral Gables, FL 33134. Phone toll free: (800) 327-0787 (except FL (800) 432-5594) or (305) 443-3821).

LOCATION—Lodge located at Fresh Creek on east coast of Andros facing Andros Barrier reef, 6 miles from Andros Airport, the point of entry.

TRANSPORTATION—Air: Holiday Wings—one hour direct flight from Ft. Lauderdale. Phone: (800) 327-2514. Bahamasair from Nassau. Ground: taxi from airport \$6.75 for two. Car rentals usually available.

ACCOMMODATIONS—Twenty cottages built of coral rock and Andros pine situated on a 200' private beach. All rooms are beachfront with private bath, some with waterbeds. Sailboats, windsurfing, whirlpool hottub, fitness trail, solarium for sunbathing, volleyball. Rates are FAP. 10% service charge. American Express accepted.

DIVING AVAILABLE—

Shallow reef yes	Walls yes	Drift dives yes
Mid reef yes	Wrecks yes	Night dives yes
Deep reef yes	Caverns yes	Beach dives yes

DIVING EQUIPMENT—Two Joy compressors, 2250 PSI. Sixty 72 cu/ft tanks. Three 28-31' Flattop pontoon boats with a total diver capacity of 45. Complete retail sales. Camera film and photo finishing available.

DIVING SERVICES—NAA, NAUI, PADI affiliation. Five instructors available. Free resort course offered. Cost half day diving (1-2 tanks) \$14, full day diving (2-4 tanks) \$28, night dive \$18. Tank/bac pac, mask, weight belt/weight and regulator included in dive rate.

DIVING PACKAGES—7 days/7 dives for \$448, 7 days/14 dives for \$560, 7 days for non-diver \$336. Includes accommodations based on double occupancy, three meals per day, welcome drink and underwater slide show. Dives are half day reef trips with all gear, boat and guides. Group rates are available and vary according to group requirements and time of year. Contact above address for details.

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ANDROS ISLAND BAHAMAS

Twenty years ago we found a bit of space in a magnificent natural setting, of vast horizons, clean and clear skies and seas. We have lived here, on Andros, since then and invite you to join us. But only forty of you at one time! Small is beautiful!

**UNDERWATER EXPLORERS SOCIETY—
GRAND BAHAMA ISLAND**

Freeport/Lucaya, Grand Bahama, Bahamas. Phone: (809) 373-1244.

RESERVATIONS: Unexso, P.O. Box F2433, Freeport, Grand Bahama. Phone: (809) 373-1244. Bahamas Reservation Service, phone: toll free (U.S.) (800) 327-0787 (except FL (800) 432-5594), or (305) 443-3821.

LOCATION—Situated on the water in Lucaya, one-quarter mile from the ocean in the Lucayan Bay Hotel complex. Six miles from the airport.

TRANSPORTATION—Air: Air Florida and Bahamasair from Miami and Ft. Lauderdale. Eastern from Miami. American from New York. Ground: Taxi from airport \$6.00, major car rentals at airport. Private plane facilities at Freeport International Airport. (78 miles from South Florida).

ACCOMMODATIONS—Thirteen hotels on Grand Bahama ranging from economy to luxury with 2,000 rooms. Many with oceanview, private balcony. Casino gambling in Freeport. Major credit cards accepted at hotels. Call Bahamas Reservations number listed above for rates and availability.

DIVING AVAILABLE—

Shallow reef yes	Walls yes	Drift dives yes
Mid reef yes	Wrecks yes	Night dives yes
Deep reef yes	Caverns yes	Beach dives no

DIVING EQUIPMENT—Twin Ingersoll-Rand compressors, 3500 PSI. One hundred and thirty 72 cu/ft tanks, two boats include 42 ft. Thomas with 24 diver capacity, 32' Prowler with 18 diver capacity, full retail sales. Dive complex includes 18-ft. training pool, museum, recompression chamber, health club, and divers lounge, The Tide's Inn.

DIVING SERVICES—NAUI, PADI affiliation. Nine instructors/guides. Full range of diving programs includes resort courses, 6-day certification course, night dives, inland blue hole dives and decompression diving course. Cost single tank dive \$23, 6 dives \$110, 7-day unlt. diving (3 per day) \$210. Rates include equipment.

DIVING PACKAGES—Several packages available with different hotels. 4 days/3 nights \$130 winter (includes 3 dives). 7-day unlt. diving \$332.50 summer. 7-day basic scuba course with accommodations \$364. All rates per person double occupancy.



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Send for **FREE DIVE CERTIFICATE** and **Color Brochures**. Use attached post cards or write U.S. Mailing address: UNEXSO, P.O. Box 15933, West Palm Beach, FL 33406



STELLA MARIS INN— LONG ISLAND

Stella Maris, Long Island, Bahamas. Phone: (305) 764-8309/8296.

RESERVATIONS: Bahamas Reservation Service, 255 Alhambra Circle, Suite 435, Coral Gables, FL 33134. Phone toll free: (800) 327-0787 (except FL (800) 432-5594) or (305) 443-3821).

LOCATION—Inn located on hill on northern tip of Long Island within walking distance of village, one mile from Stella Maris Airport.

TRANSPORTATION—Air: Bahamasair from Nassau and Miami. Inn's own air service from Nassau to Stella Maris. Ground: taxi from airport to Inn \$1 per person. VW Safari jeep rentals \$20 per half day.

ACCOMMODATIONS—Inn has 50 suites, rooms, studio apartments, cottages and townhouses with up to 3 bedrooms. Club has 10 lanai suites in guest cottages on 3 mile white sand beach. Complex is surrounded by landscaped gardens and overlooks the ocean, ½ mile from marina. Rates: Inn, single \$59-65, double \$83-109. 10% gratuities, 3% room tax. Club, single \$74, double \$98. 15% gratuities, 3% room tax. Rates are AP. American Express accepted.

DIVING AVAILABLE—

Shallow reef yes	Walls yes	Drift dives yes
Mid reef yes	Wrecks yes	Night dives yes
Deep reef yes	Caverns yes	Beach dives yes

DIVING EQUIPMENT—4 Mako/Bauer compressors, 2 mobile diesel, 2 electric, 2500 PSI. Eighty 72 cu/ft tanks. 4 dive boats include 62', 42', 32' and 28' for total diver capacity of 60. Limited retail sales. U/W camera rentals from \$12. Film processing available.

DIVING SERVICES—BARAKUDA, PADI affiliation. 3 instructors and 4 divemasters. Resort course \$38 for 2 days. Scheduled full certification and advanced diving courses \$150. Cost half day diving (1 tank) \$20, full day diving (2-3 tanks) \$30, night dive \$25, basic gear included.

DIVING PACKAGES—8 days/7 nights for \$459-559 single, \$359-409 double, per person double occupancy. Minimum rates for inn, maximum rates for club. Includes all meals, accommodations, round trip air transfers from/to Nassau, basic gear, 2-3 dives per day, 1 day's use of rental jeep. Week's Economy Scuba Package of 8 days/7 nights for \$319 single, \$299 double, per person double occupancy. Rates are EP.

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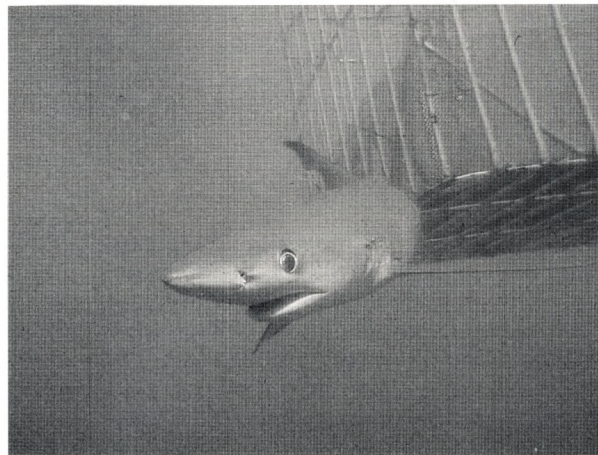


PHOTO: MARTY SNYDERMAN

DIVE WITH THE BEAUTIES
OF THE DEEP



P.O. Box 105 Stella Maris Post Office
Long Island, Bahamas Phone: Stella Maris Cable Stellamar

XANADU DIVERS— GRAND BAHAMA ISLAND

Xanadu Marina, Grand Bahama Island, Bahamas. Phone: (809) 352-2988.

RESERVATIONS: Xanadu Divers, c/o O.J. Holden, P.O. Box F16, Freeport, Grand Bahama, Bahamas. Phone: (809) 352-2988 or 352-6782 (ext. 800).

LOCATION—Dive shop and boats located on south side of island, 4 miles from airport, 2 miles from downtown. Protected marina on site on property. Walking distance of Howard Hughes' Xanadu Beach Hotel.

TRANSPORTATION—Air: Bahamasair and Air Florida from Miami and Ft. Lauderdale. Ground: taxi from airport \$3.50 per person, major car rentals available.

ACCOMMODATIONS—Xanadu Marina is full service marina with 28 berths (minimum draft 8'). Cost per day \$.75 per foot, includes telephone, cable and water. Electrical and waste connections available. Gas and diesel fuel on site. Waterskiing, sport fishing, shark fishing, tennis, boating, golf, parasailing and day and moonlight wine and cheese sailing cruises available. Travelers checks accepted.

DIVING AVAILABLE—

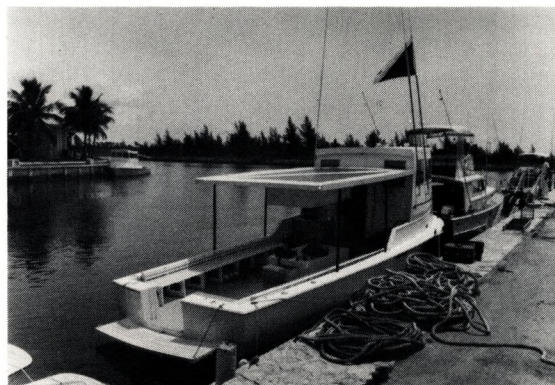
Shallow reef yes	Walls yes	Drift dives no
Mid reef yes	Wrecks no	Night dives yes
Deep reef yes	Caverns yes	Beach dives no

DIVING EQUIPMENT—Ingersoll Rand compressor, 3500 PSI, 15 cfm. Sixty 72 cu/ft tanks. One 40' custom dive boat powered by diesels with freshwater rinse/shower, private head, beverages on board, depth-finder, VHF, CB, shaded and sun deck, cut through transom, oxygen, platform and ample gear storage. Total diver capacity of 25. Four 14' Boston Whalers available for rent. Full retail sales and complete line of scuba rental equipment.

DIVING SERVICES—NAUI affiliation. 2 instructors and 1 divemaster, CPR first aid trained. Resort course \$20. Full certification, advanced diving courses and first aid/CPR training available on request. Cost half day diving (2 tanks) \$25, full day diving (3 tanks) \$35, night dive \$25, 1 tank dive \$19, snorkel trip \$10. Basic equipment included in dive rate. Headquarters of BASRA, recompression chamber available 24 hours.

DIVING PACKAGES—For complete details on private charters and group rates, contact above address.

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Sea Technology:

The World's Biggest Oil Spill



GAMMA/LIAISON HIRSH

BY LOWELL P. THOMAS

Black death in the Gulf of Mexico.

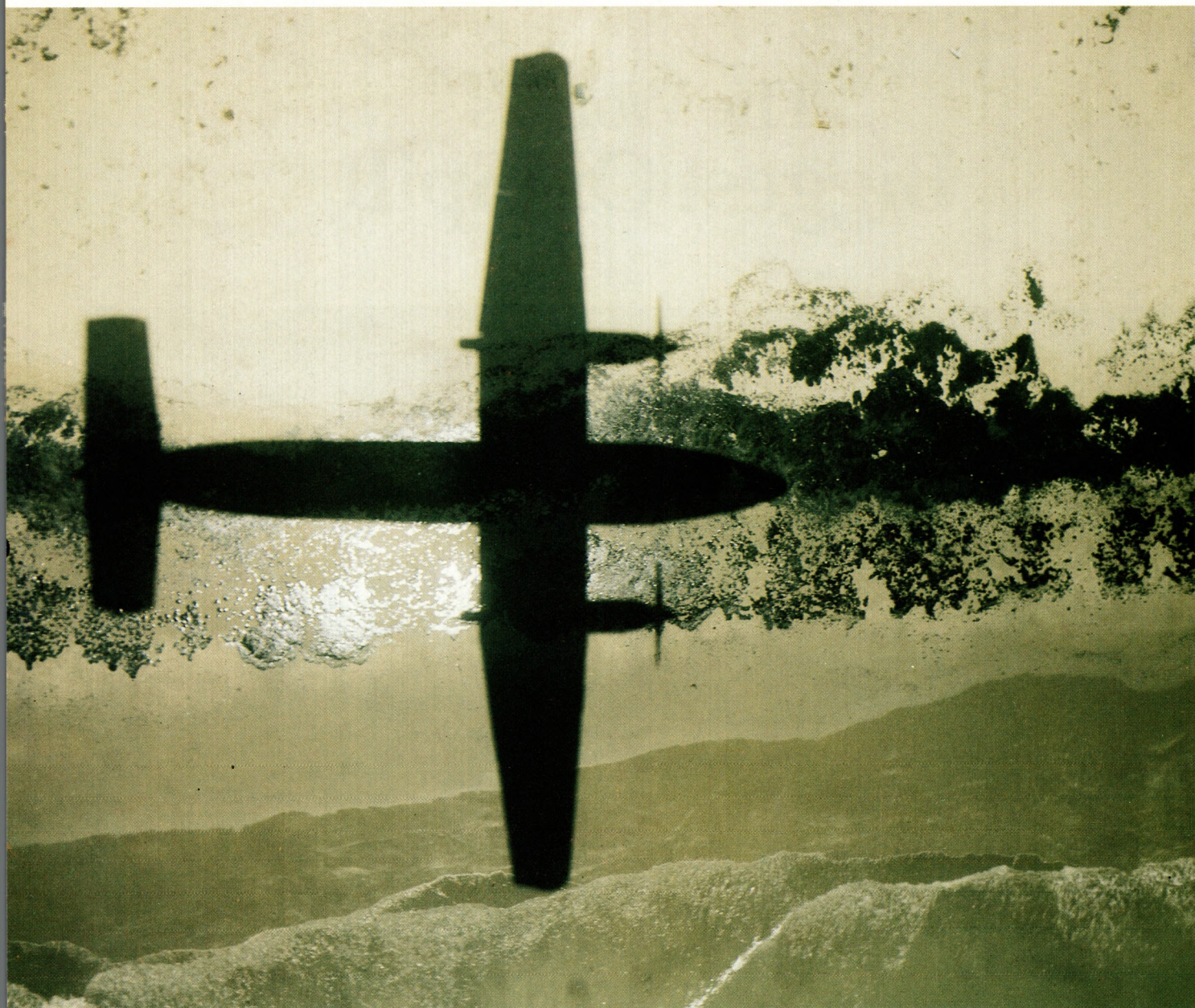
There have been oil spills before, but never like this. This one didn't just spill out of a tanker; in fact, it's not a spill at all, but a seafloor volcano of oil. The sticky crude has been erupting from a Pemex (the Mexican national oil company) offshore well at a rate of over 550,000 gallons per day for more than six months. Nearly 100 million gallons of crude now drifts in the spiraling currents of the Gulf of Mexico, driven offshore by seasonal wind changes after fouling beaches along the Texas and Mexican coasts last year. But the winds change again in March, the well remains uncapped, and we may be in for a replay of last year's fiasco.

On August 16, just as the leading edge of the vast slick was beginning to wash

ashore on Texas beaches, Sport Diver Marine Sciences Correspondent Lowell Thomas arrived in Corpus Christi, the command post for U.S. scientists from eight government agencies trying to combat the crude. He found a fatigued group of experts, their resources strained to the limit, fighting a slow-motion disaster with no end in sight. And, incredibly, a mood of cautious optimism.

On the third of June, 1979 a Mexican exploratory oil rig in the Bay of Campeche blew out. By nightfall the torrent of thick crude spewing up into the Gulf of Mexico and pooling in black slicks on the surface had reached a rate of 30,000 barrels — or 1.65 million gallons — per

continued



COURTESY NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

day. The world's largest oil spill had begun, experts said there was virtually no way to stop it in the near future, and all that oil was drifting in one direction — north, toward the Texas coast. When *Ixtoc I* blew, it blew the U.S. government into a new era of oil spill response and environmental concern. The repercussions of this single accident will be with us for years, and the blend of technology

*Dr. Lowell P. Thomas is a professor of marine science at the Rosenstiel School, University of Miami. Besides scientific journals, his work has appeared in **National Fisherman**, **Mariner's Catalog**, **Sailor's Gazette** and **Sea Frontiers**.*

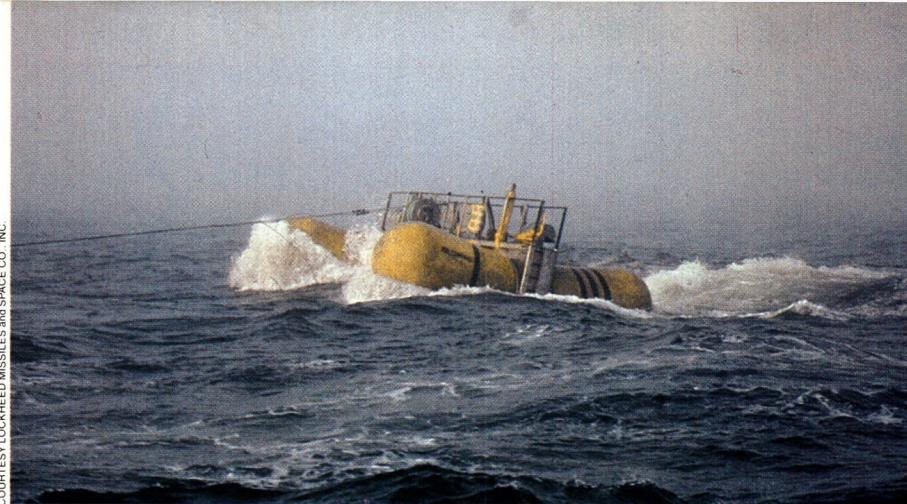
and science presently developing to combat the spill may set a standard for all future spills.

A formidable mix of government and private agencies has hurriedly assembled here at Corpus Christi, Texas where they must try to fend off the world's largest oil spill with a four million dollar contingency budget. The bill undoubtedly will go a lot higher.

The well making history is about 450 miles from south Texas beaches, and its oil has been drifting north in the Gulf of Mexico gyre (clockwise current of the Gulf) for three months.

Crude oil assumes several forms when dumped into the sea. *Ixtoc* oil bubbles to the surface, covering large

areas of water with sheen, a thin film of oil floating just above submerged, thicker globules. When the sheen combines with seawater a thick emulsion of oil and water resembling chocolate mousse is formed. As the thicker pancakes and streamers of mousse age, they form sticky tar balls that may eventually wash up onto sand beaches. Black humor runs thick as crude on these south Texas beaches among scientists awaiting the oil onslaught — it is a strange coincidence of names that has brought together the National Oceanic and Atmospheric Administration's *Buffalo* aircraft, the University of Texas research ship *Longhorn* and the Environmental Protection Agency ship



An *Ixtoc* Oil Kill: Will Turtles Go First?



No one can predict how many forms of marine life will be affected by the *Ixtoc I* oil spill, but a grim discovery by two Florida scientists indicates that few may be more immediately vulnerable than several species of already endangered sea turtles. *Ixtoc* tar balls drifting as deep as 55 feet beneath the surface will almost certainly be eaten by the turtles, resulting in rapid deaths of individuals and a significant decline of already thin populations.

University of Miami physiologist Peter Lutz examined six mature turtles — five greens and a hawksbill — recovered from Florida waters during the summer. All had thick tar in their mouths and tar balls in their stomachs. All later died. Florida Department of Natural Resources biologist Ross Witham has also found oil-killed turtles. Populations of both species were already dangerously low before the spill, but the discovery means the fate of another species is likely to be worse yet. Kemp's ridley turtle, Lutz fears, may be completely wiped out by *Ixtoc* oil.

Kemp's ridley turtle is the most endangered of all sea turtles. About 40,000 females nested in 1947 — less than 500 nested this year. The only known nesting beach for the ridleys is at Barra Coma, on Mexico's northern Gulf coast, directly in the path of the *Ixtoc* oil slick.

Biologists from Mexico and the

U.S. have worked desperately to increase the ridley population by protecting eggs from predators and releasing the hatchlings later, hoping to establish new breeding colonies near Padre Island. They were somewhat optimistic — until the *Ixtoc* spill. When the well-head blew, more than 75 percent of the hatchlings had already been released into waters now laced with crude. Conservationists worked around the clock to rescue the remaining infants by airlifting them to oil-free Gulf sites in Pemex helicopters. They had hoped that those already released could survive the newly oiled Gulf waters, but the discovery by Lutz and Witham that turtles will eat oil may mean the ridley population has little chance of survival. Their habitat has been flushed with 100 million gallons of thick crude spread in slicks across the surface, carpeting their breeding beaches and clumped in bite-size globules under the surface. There is further evidence that sea turtles can be harmed or killed just by being coated with surface oil. For the ridleys, the odds may prove too great. There are too few ridleys.

The *Ixtoc I* blowout may provide scientists with an experiment no one wants. It won't be a neat laboratory experiment, but it will be simple. It will take about two years to complete. The results will be written on the beaches at Barra Coma. — L. P. Thomas

Opening page: Flaming gas marks the spot where *Ixtoc*'s oil geyser breaks the surface, spreading thick crude north toward Texas at a rate of more than 380 gallons per minute. Far left: Padre Island, on the south Texas coast, has so far collected most of the oil threatening U.S. coastlines. By press time, the Coast Guard had scraped 12,522 cubic yards of oil/sand mixture off the beach, skimmed 24,720 pounds of oil from surface waters just offshore and vacuumed 46,975 gallons of oil/water emulsion from pools trapped by Navy booms. Left: A Lockheed "Clean Sweep" skimmer plunges through heavy seas on its way to work.

Antelope here to chase the mousse.

What can you do with more than a hundred million gallons of oil lapping ashore along the Texas barrier islands and threatening to sweep through passes into the ecologically rich lagoons beyond? Such a vast quantity of oil, like the proverbial 400-pound gorilla, goes wherever it damn well pleases. Slicks ten miles long and a mile wide are not controllable. Despite state-of-the-art technology and scientific expertise, the oil will continue to coat Texas beaches and some will drift through passes.

Captain Roger Madson, the Coast Guard on-scene coordinator, is the first to point out that there's going to be some oil where it shouldn't be — that nothing he can do will totally protect the environmentally sensitive lagoons. The options may appear grim but Madson has his priorities, and from his temporary office — ironically located in the basement of Corpus Christi's Oil Industry Building — he calls the signals with all the *sang-froid* of an NFL quarterback. He realizes there is no way he can keep oil off the beaches. In fact, the hundreds of miles of beaches on the barrier islands form a powerful line of defense by shielding the fragile estuaries.

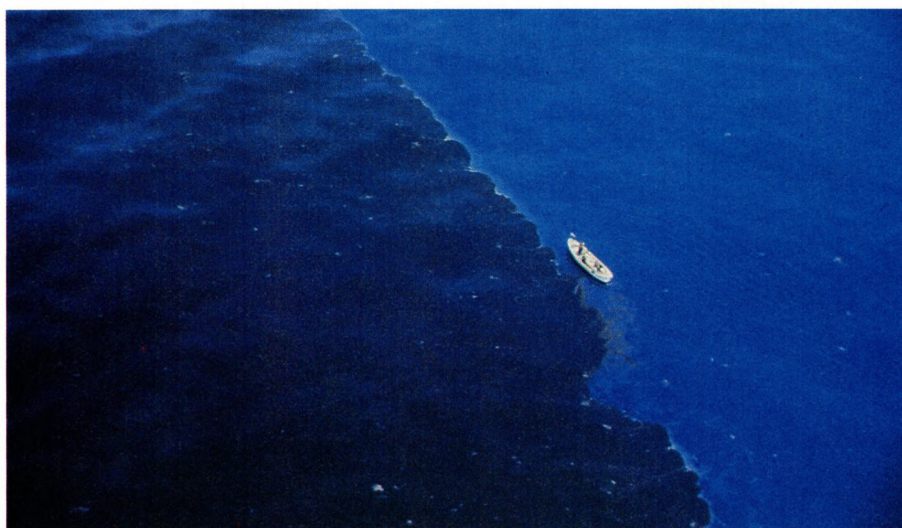
Front-end loaders work day and night scooping up oil as it comes ashore. The catch-phrase is "get it quick" before it leaches out toxic aromatics and permanently mixes into surrounding sands. That's the easy part. But the lagoons just beyond the islands require more effort and often quick decisions.

Oil can enter lagoons only through the narrow passes between islands, and some of these can be fenced across with floating booms that will concentrate the oil where surface skimmers can clean it

continued

The leading edge of the world's largest oil slick surges toward the Texas coast, dwarfing a launch from the Coast Guard cutter Valiant.

up. The Coast Guard has some booms and skimmers, borrows some from the Navy, and contracts with private industry for others. Madson is rapidly finding out what will work and what won't. One high-performance skimmer used at



COURTESY U.S. COAST GUARD

Responsibility: Who Will Pay?

If you think the beaches of Texas are a mess from the Pemex blowout, consider the bureaucratic/political/environmental maze left to be unraveled of who will foot the multi-million dollar cleanup bill.

A portion of the cleanup is being financed by a special U.S. disaster fund. According to Rich Griggs of the Coast Guard Information Office, the Federal Water Pollution Control Act of 1973 establishes a revolving fund for cleanups of \$4 million, fed by money obtained by assessment of penalties and repayments of government loans to fight specific spills. So far \$4.1 million has been spent to clean-up Texas beaches and Congress has appropriated another \$2.5 million to add to the fund. But estimates to assess the damage alone have reached \$12 million.

Meanwhile, Mexico has steadfastly refused to discuss payment of damages to the U.S. for the effects of the spill, although *Texas Monthly Magazine* reports Mexico has spent \$50 million on the spill — money which may have been largely wasted. Their dispersant over-dispersed, work crews have been told to knock off each day at 6 p.m. to comply with Mexico's labor laws and there are reports of tugboats colliding with oil skimmers among other things.

No one is sure yet what actually happened June 3 when the 12,000-foot deep well blew, since no U.S. observers were allowed on the site for 19 days. It is believed that drilling mud, which is circulated to the bot-

tom of the well to hold down oil and gas, lost pressure. The rig crew began to pump in new mud and when that ran out they pumped seawater. But the oil and gas continued surging so a second line of defense was enacted. Blowout preventers — a series of valves designed to cut horizontally through the drilling pipe and seal the well — jammed in the slicing process, ruining Pemex's \$22 million drilling rig and spewing oil and gas into the Gulf. The flow has been stemmed by pumping steel balls down the well, but the gushing oil won't be fully contained until the completion of relief wells now being constructed 800 yards from the original site.

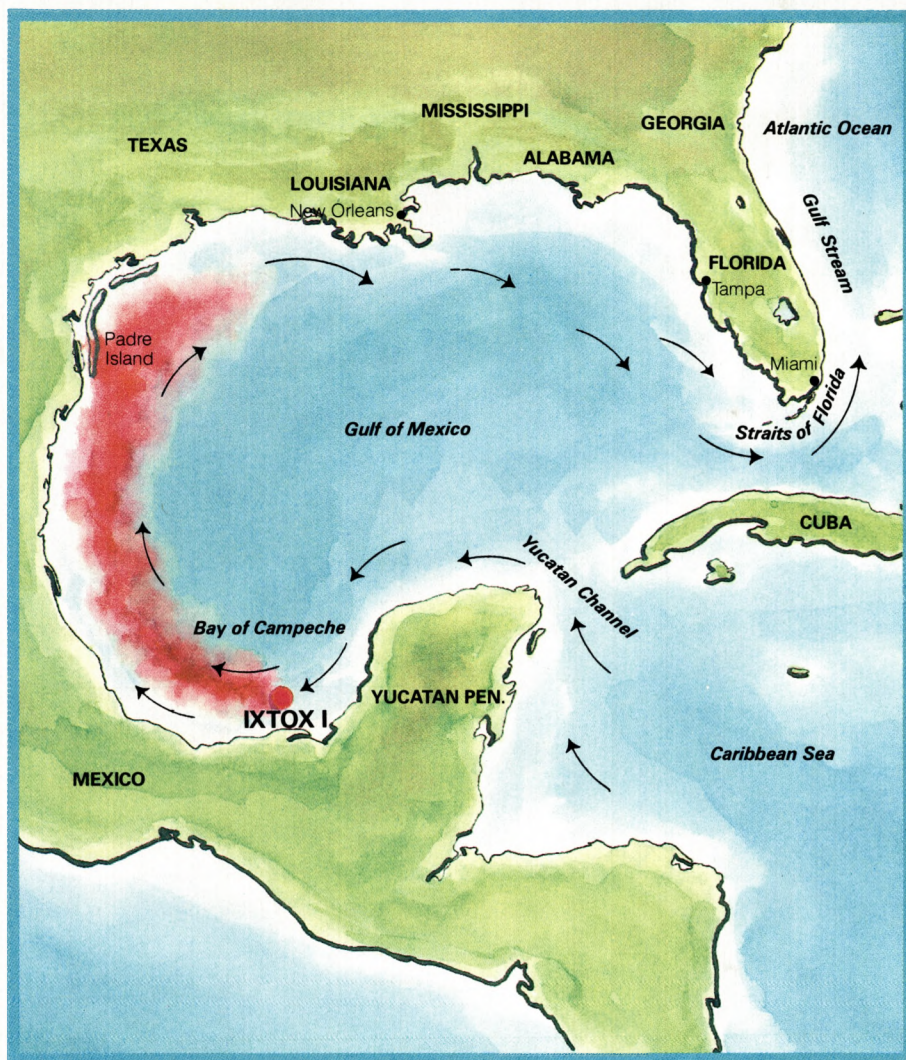
Ironically, the fateful rig was leased to Pemex by Sedco, a Dallas-based company founded by Texas Governor W.P. Clements and now headed by his son. Clements contends Sedco cannot be held liable since they turned the rig over to Pemargo, a Mexican firm subcontracted by Pemex to drill the well. But the governor may have gained a few enemies when he called the spill "much to-do about nothing" and assured the Mexicans that it would be silly for the U.S. or Texas to sue.

In October, the U.S. and the State of Texas both filed suits against Sedco. The U.S. government is seeking \$6 million for cleanup expenses and an unspecified amount for damages. In a state suit, Texas Attorney General Mark White is asking \$10 million for damage to Texas beaches during tourist season. Suits totalling more than \$350

million have been filed by fishermen, shrimpers and the State of Texas against Sedco and the two Mexican firms.

At the direction of Mexico's President José López Portillo, the Mexican Foreign Ministry pointed out in an August statement that international law provides no basis for a U.S. lawsuit against Mexico. Citing "ten wells out of control at this time" (seven in the U.S., one in Canada and one in Iran), Portillo said it was "strange" that the media had restricted press coverage to Mexico's well. After late-September talks with President Carter, Portillo said Mexico "will not pay for damage in the Gulf of Mexico," but left open the possibility that a future agreement between the two countries could make each responsible for ecological damage inflicted on the other.

The whole oil spill disaster has been ill-timed — politically speaking. The Carter Administration doesn't want to offend Mexico, especially in view of recent negotiations to buy its natural gas and possibly its oil. Yet, many observers blame Mexico as the source of all the blunders, from blowout to cleanup. On top of all this, the worst oil spill in history was the result of an *exploratory* rig. Pemex has plans to drill many more wells in Gulf waters in the future. What will happen if one of them blows? Will oil spill cleanups become an annual disaster in the Gulf? And who will pay for it all? It hasn't yet been determined who will foot this bill. —Kathleen McHugh



Petroleum's Progress

Part of the strong surface current pouring through the Yucatan Channel circles westward across the Ixtoc I site, spreading oil up the Mexico and Texas coasts. Although a current reversal in October diverted oil from the Texas coast, another seasonal reversal in March means most of the oil will drift completely around the Gulf, fouling beaches en route. Eventually its remnants will exit through the Straits of Florida.

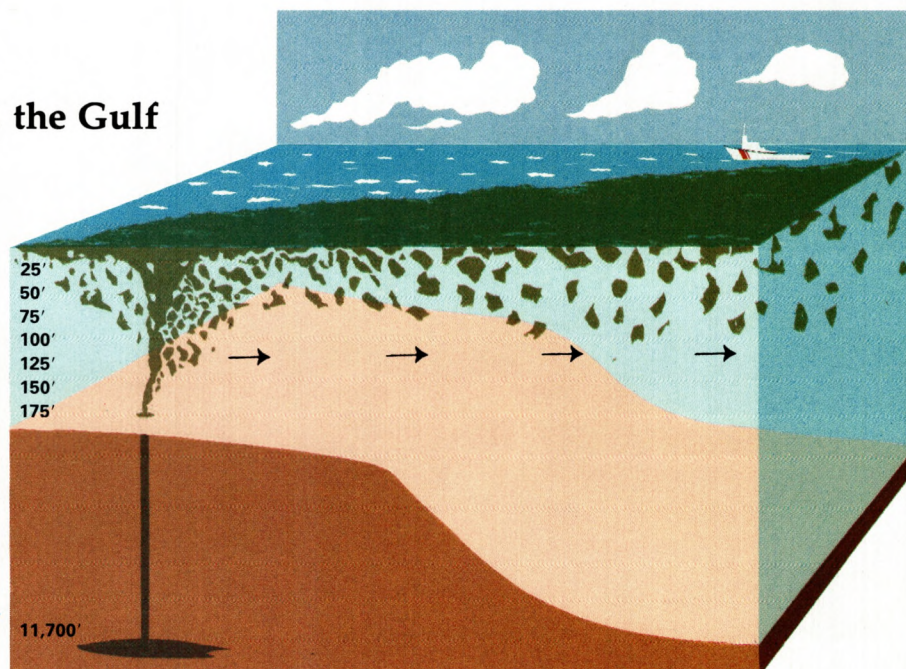
Mansfield Pass choked to death on two-month-old Mexican oil that had drifted inshore. It now lies in disgrace on the Port Isabelle baseball field, fouled out of the clean-up game by tar balls.

Fortunately, eight Marco skimmers, which operate on a conveyor-belt principle, have been successfully picking up thicker tar from the Rio Grande north. These 36-foot vessels simply back into the oil and lift it on board with a filter-belt extending from the stern down to the waterline. As a last defense against oil intrusion into sensitive lagoon marshes, booms placed across some passes collect surface oil for the skimmers.

continued

Runaway Geyser in the Gulf

A three-dimensional view (not to scale) shows the path Ixtoc's massive oil geyser follows. The thick crude erupts from a seven-inch pipe sunk 11,700 feet beneath the Gulf floor. At a nozzle pressure of more than 2800 psi, the oil bursts into seawater and jets toward the surface 170 feet up. There it combines with seawater to form an emulsified blanket of sheen, mousse and tar balls that are carried west and then north by prevailing currents. Vast slicks, some ten miles long, break off from the mass accompanied by subsurface globules of oil emulsion and tar balls riding as deep as 55 feet down in the water column.



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mers. It is frustrating, slow work, but it seemed effective until divers found tar balls up to two inches thick drifting in clumps as deep as 40 feet beneath the surface. Madson, charged with protecting the fertile marine spawning ground of Laguna Madre, ordered six-foot-deep, fine-mesh nets added to some booms. They helped, Madson says, "... but, unfortunately, we do not have the capability to handle what may be coming in beneath." They seemed to work, and whatever works is used to the hilt — Madson is playing it by ear. Nothing like this has happened before, and he's writing the rulebook as he goes.

Captain Madson is confident his men can head off most of the oil at the passes, but he needs a lot of advice, and that's why so many government agencies are involved. How much submerged oil is entering the estuaries under the booms? How much is hiding under surface patches of sheen? Big questions. Bill Phoel and his co-workers are providing some of the answers.

Phoel is a diver, and looks it. He sports a shaved head, black handlebar moustache, and he's big, about six feet four inches. He flew in from the NOAA laboratory in Sandy Hook, New Jersey to check the credentials of divers from the University of Texas hurriedly pressed into service under contract to the government, but soon found himself handling heavier responsibilities. Phoel is not just a diver: He has a PhD in biological oceanography and has done studies of bottom-dwelling animals around the world. Here in Corpus Christi, Phoel works from early morning to late evening, diving from helicopters, using measuring techniques he developed on the spot to estimate the amounts of oil entering the lagoons as submerged droplets and tar balls.

The work never stops. At 7 p.m. Phoel and the other scientists meet with Captain Madson for a two-hour briefing and planning session. By half past nine he is wolfing down a substantial meal and planning the next day's work. If he's lucky he gets to bed by midnight. Like the rest of the scientists here, he works seven days a week. To make their hectic task easier, Phoel and Marc Kaiser, a NOAA diver from Miami, are converting a rented van to a dive locker complete with compressor, tank racks and gear lockers. It will enable them to meet helicopters at intermediate points between dive sites to fill tanks. But this is

just another combat-zone expedient, makeshift and good enough. In the seige mentality of the moment, you take what you can get and hope it's enough. Asked about the van, Phoel shrugs. "We rented it for a week and now we don't have the cash to pay for it, so we might as well make a dive locker out of it."

Passes north of Padre Island, around the Aransas Wildlife Refuge, are too big or have tidal currents too strong to permit complete booming off. All that can be done here is the emplacement of booms staged inside the passes to deflect oil into pockets that can be skimmed. Big Navy booms are preferred for the heavy-duty work in the passes, but the Coast Guard has its own rugged Open Water Oil Containment and Recovery System.

The OWOCRS system is simple, big and effective even in seven-foot seas. It consists of a 612-foot inflatable boom and a skimmer. The boom can be maneuvered into place by two vessels, and contained oil is picked up by a Lockheed Clean-Sweep skimmer. Under ideal conditions the Lockheed skimmer can collect 1400 barrels of oil per hour on a series of slotted discs separated by wiper blades. Oil adheres to the metal discs where it is removed by the wiper blades and transferred to holding tanks.

The original idea was to drop the Coast Guard's giant oil booms from C-130 cargo planes into the water. But at 15,000 pounds each, the booms proved too unwieldy — the sudden drop of that much weight played dangerous games with the aircraft's stability, and the idea was abandoned. They are now being deployed by ships or, if seas permit, by fast surface delivery sleds towed by small Coast Guard vessels.

The Coast Guard has regional clean-up teams deployed at various coastal sites, but this is one spill they couldn't possibly handle alone. Here in Corpus Christi, the regional teams are aided by one of three highly trained Coast Guard Strike Teams. These Atlantic, Pacific and Gulf teams can respond in an hour to spills anywhere in the U.S. or, if requested, in foreign countries.

Initially, the Mexican government contracted a commercial clean-up team to work the well site, but rough water and competition for sea room with crews trying to cap the blow-out made their efforts ineffectual. No American scientists were allowed by the Mexican government to inspect the well site until

three weeks after the blow-out, and it wasn't until near the end of July — almost two months into the spill — that Mexico requested a Coast Guard Strike Team. By then the slick had grown to more than 84 million gallons of crude, and the Gulf Strike Team was already at work along the Texas coast. Mexico will foot the bill of \$18,000 per day for the Pacific Strike Team, but so far has refused to help pay for the Texas clean-up and damages.

This spill is a first for the Coast Guard in many respects. Usually the oil is fairly isolated and is spilled over a period of a few days. The *Ixtoc I* spill is already spread over tens of thousands of square miles and has been spilling continuously for more than three months. Underwater oil is another new problem. Oil from the *Ixtoc I* spill is heavy, near the specific gravity of surface seawater. Some of it floats, some rides in the water column down to at least 55 feet. It has even been suggested that considerable amounts of oil may be drifting at the thermocline (the region between upper layers of warm water and deeper cold water) from 100 to 300 feet down.

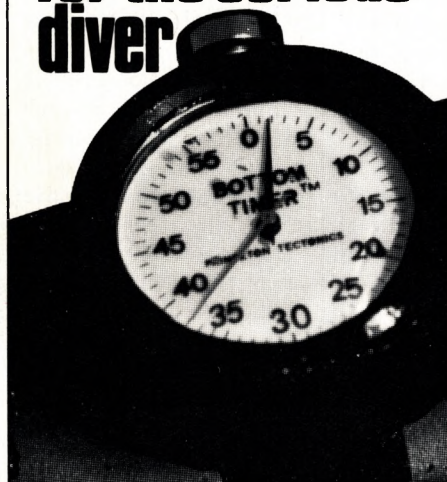
Compounding the problem are chemicals dumped into the Gulf by the Mexicans in an attempt to reduce the apparent size of the slick. Oil dispersants dumped near the well-head may have caused much crude to break up into cornflake-size chips and sink. When small blobs of oil began appearing 40 to 50 feet beneath the surface, the U.S. government formally requested that Mexico stop using dispersants. As of this writing, scientists are unsure of the amount of oil sunk by the chemicals, or where it will end up.

One of the immediate problems confronting the Coast Guard is locating the oil and predicting where it will go. Coast Guard C-130s fly continuous search patterns, but other aircraft and ships are needed. Oceanographer Jerry Gault, from NOAA's Seattle laboratory, flies almost every day in the NOAA *Buffalo*. His job is current modeling, and it's not a textbook approach.

Gault uses every piece of information he can get from his own flights and from a catch-basket of other sources. Current probes are dropped into the large oil slicks and they drift along, signaling their position to satellites. A 20-foot Nomad buoy has been anchored 65 miles off the Texas coast where it transmits data on water and air temper-

continued

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OIL SPILL *continued*

atures, humidity, barometric pressure, wind force and direction and wave spectra to the National Weather Service in San Antonio. Eotech current probes, which release dye at timed intervals, drift in the surface layers and yield colorful records of their progress. On board the *Buffalo*, side-looking radar (SLAR) scans the sea surface out to a 25-mile range, showing oil slicks as smooth patches in the rough sea. Shape, size and movement of the slicks are recorded using infrared imagery and photo-reconnaissance cameras. Precision navigational equipment is coupled into the cameras so photos and images are labeled with exact time and location.

But even these efforts, despite the accuracy and volume of data collected, are not enough to make precise predictions of surface drift. The usual flow is northward, moving the oil relentlessly toward the Texas barrier islands, but variable winds sometimes produce currents that defy the rules and flow to the south. Meteorologists from the National Weather Service provide wind predictions for Gault's current models. Using all this and perhaps a bit of witchcraft, Gault and colleagues work into the night compiling the figures that the computer terminal in his motel room will relay to a NOAA computer in Maryland.

This type of current prediction is critical — and difficult. Few oceanographers would care to risk day-by-day predictions using such disparate data. The long days of flying and long nights of assembling and transmitting data have taken their toll, and Gault smiles wryly as he speaks of his work. It's seat-of-the-pants science, not suited for the traditional, conservative oceanographer. But the problem is immediate, and someone's got to do it. There is no alternative. The Coast Guard needs predictions, and it is Gault who must go out on a limb to get them. Here on the south Texas coast there is simply no time for conservatism.

Beaches on Mustang and Padre Island started catching oil by the middle of August, but the worst is yet to come. Some very serious questions will be resolved over the coming months: How much oil will come ashore? How much will get into ecologically sensitive lagoons? Just how toxic is this oil? What will be the long-term effects? Government sources estimate a minimum of 12 million dollars will be needed just to assess, not repair, the damage.

While Jerry Gault sorts out the oil slicks, University of Texas chemist Patrick Parker directs oil toxicity studies. Surprisingly little is known about the toxicity of oil, one of our commonest pollutants. The question of oil toxicity has quickly become a vital one on the Gulf Coast and the Texas fishing industry, headed by a shrimp fishery worth more than 140 million dollars a year, is among the most concerned.

The answers, if and when they come, will come from scientists swarming over Corpus Christi from many government agencies. They are dedicated, hard working and almost all young. Somehow John Robinson, a NOAA scientist from Boulder, Colorado coordinates their efforts. They have literally taken over a large beach motel, converting bathrooms to chemical laboratories, closets to darkrooms and spreading data over the carpet, desks and beds. As time wears on and the problems increase, more help arrives. But it won't end here. The Gulf current gyre sweeps irrevocably northward. Louisiana is next, and it has no barrier islands to keep oil out of its estuaries.

You can buy a T-shirt out on the beach that says "I got oiled on Padre Island," but the best one in Corpus Christi isn't for sale. It is worn by Barbara Morson and other members of the Damage Assessment Team working with government scientists. On the back it reads "Dam. Ass. Team," on the front, "Texas Oil Spill, 1979-?"

When you think about it, it's not a very funny shirt.

Just before press time, two unconfirmed developments at the spill site raised hopes that the runaway well may soon be under control. After many unsuccessful attempts, an oil collecting device ("Sombbrero") shaped like a huge inverted funnel has been set in place on the surface over the well. And two relief wells begun in August may soon punch through into the Ixtoc shaft, drawing off enough pressure to allow the damaged well head to be capped.

Spokesmen for the Coast Guard say both reports are unconfirmed, and no one is certain how effectively or how soon the oil flow can be stemmed. "At this point we're dealing with a lot of 'ifs,'" said a Coast Guard source in Washington. "There has been no response from Mexico to our inquiries, and nobody knows what the actual situation is, or the rate of oil flow."

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Product Survey:

Exposure Suits

Black rubber is out and there's a new look in neoprene. These new exposure suits work better, last longer and look sportier than yesterday's models.

BY LOU FEAD
PHOTOGRAPHY BY
JOHN LIDINGTON

Red, blue or green—nylon—one or nylon-two—twist-locks or Velcro—high waist or farmer john—hood attached or, not—the choices in exposure suits for the 1980s are infinite compared to those of just 20 years ago.

Back then it was simple. Should I buy my wetsuit or make it?

Homemade or store-bought, the Model T wetsuit of the 60s, with its basic black skin-two-sides neoprene, has gone the way of the horseless carriage. Extinct, except in memories and some specialty wetsuit cutting rooms, it's been replaced by myriad descendants that hardly resemble their ancestor at all. Many don't even look like wetsuits.

Today's exposure suit is just that: a garment protecting the diver from exposure to some sort of hazard. It could protect against over-exposure to cold water, as in the old days. Or keep stinging creatures away from bodies where warmth is not of prime concern. Even a bikini is an exposure suit. It protects against indecent exposure.

Whether it's shielding the diver from the chill of icy waters or the burn of tropical sunshine, today's exposure suits are designed to meet specific requirements created by the diversity of modern sport diving activities and locales. Our survey will touch on the range of suits available for the discriminating sport diver. But first, let's make sure we understand wetsuits.

A wetsuit helps keep a diver warm in two ways: by restricting the flow of cooling water over the diver's body, and

*Lou Fead is a freelance writer and instructor. Author of the book **Easy Diver**, Lou has directed several international education conferences for NAUI.*





by *insulating* the warm diver from the cold water. The definitions of cool and cold are open so feel free to wear a full-length wetsuit in any temperature water—even the tropics—like I do.

The best way to restrict the flow of cold water over a diver's body is to have an exposure suit that fits like a second skin between the water and the diver. Usually that means a custom-made suit, but sometimes a ready-made will do for the standard-size diver.

Insulation is provided by the gas that is trapped in the neoprene wetsuit material, not the neoprene itself. The thicker the material, the more gas trapped, the warmer the diver.

Wetsuit material comes in many configurations. The original skin-two-sides (S2S) is the basic insulation. With nylon fabric bonded tightly to one side,

Left: U.S. Nemrod's Canada of approximately 1/4-inch neoprene is handmade by Spanish craftsman. Suit lists for \$285; hood, \$22; diver's boots, \$43.60.

Above: Bluewater Wetsuits 1/8-inch French-cut short jacket of N2S is \$110; Harvey 3/16-inch long-sleeve jacket of N2S with color piping is \$59. Right: Imperial drysuit of 1/4-inch N2S is \$404 with knee pads and molded-sole boots; Henderson Aquatics zip-on of 3/16-inch N1S and neoprene is \$255, knife pocket extra.



continued

it's nylon-one-side, or N1S. Nylon on both sides makes it N2S.

The nylon gives strength to the neoprene which alone is easy to tear with fingernails, belt buckles, barnacles and other solid objects. Nylon on adjoining pieces can be stitched together for stronger seams.

Used on the inside, the nylon's slipperiness makes a suit easier to put on, much to the delight of men whose legs have been made hairless by struggles with S2S pants. Most of the nylon-inside suits have textured patterns on the outside which are more pliable than a flat surface and allow a closer fit.

Used on the outside, the nylon's durability makes the suit quite resistant to abrasion so it lasts longer. It can also be made in colors other than the basic Model T black.

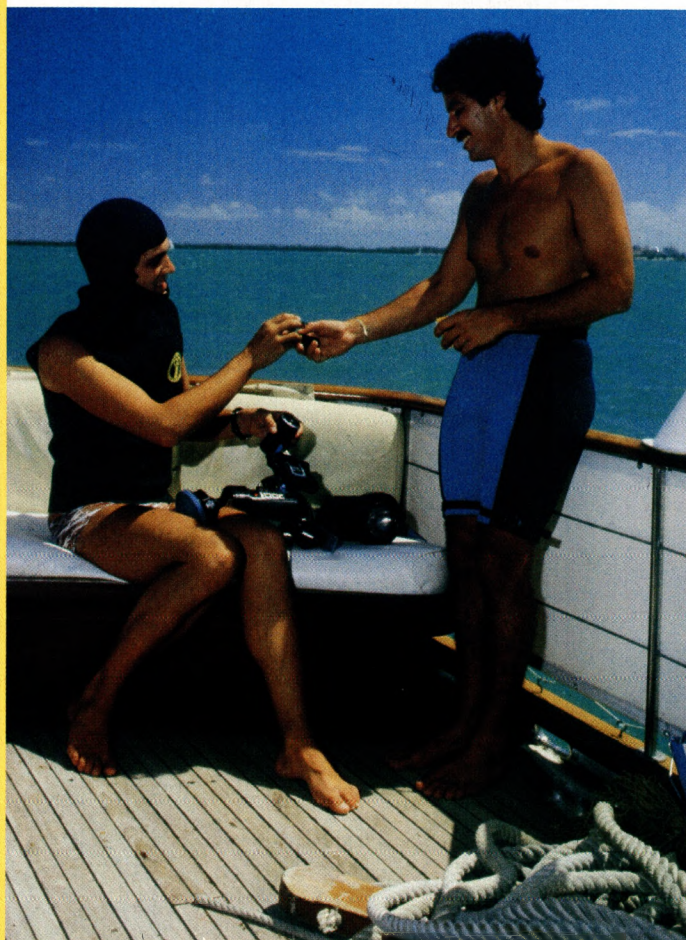
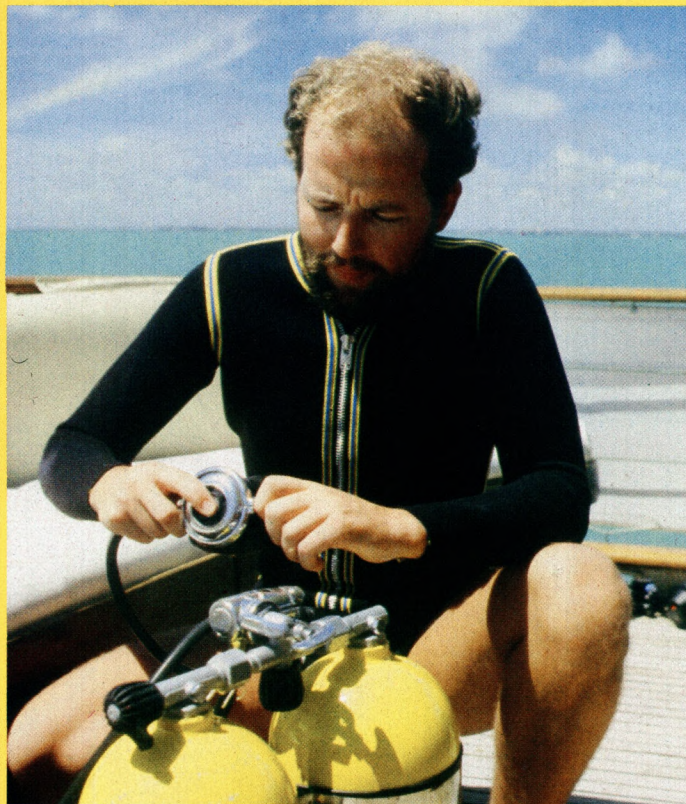
Colors on exposure suits certainly brighten diving, but more importantly, actually make it more comfortable. Light colors reflect the sun's heat better than black does. That keeps a diver cooler while standing around on a hot day. Black-suited, he'd sweat buckets.

Color also brings individuality to diving. High visibility suits, reversed panels and racing stripes all help divers express their personalities in their suits. Underwater photographers prefer color because it spices up their photos in addition to preventing their models from being blacked out, or visually merging with the background.

Now let's look at some specific kinds of exposure suits, starting with the least that can be so called—"trunks." Essentially boxer-style swim trunks made of thin N1S, they're form-fitting, warmer than cloth or nylon trunks, and built to match similar garments, like the neoprene sweater known as "sleeves." For the diver/surfer/beach person wanting that slight touch of warmth, trunks can be worn alone or under an exposure suit without bunching up.

More effective at warming a wet body is a hood. That may sound strange, but since the head radiates up to 50 percent of the heat given off by a diver, and the area covered by trunks radiates less, covering the head prevents more heat loss than covering the lower torso. Result: The whole body feels warmer.

Hoods come in several styles, none attractive enough to wear alone. But with a sleeveless torso section attached,





Clockwise from left:
Parkway/Poseidon hooded
unisuit of 1/4-inch N2S retails
for \$670; Henderson Aquatics
1/4-inch zip-on of N1S and
neoprene is \$262. U. S. Divers
hooded vest of textured
1/8-inch N1S is \$31.95; O'Neill
trunks with thigh straps are
3mm N1S for \$41.75. Harvey
color-taped jacket of 1/8-inch
N2S is \$49. Seasuits 1/4-inch
full wetsuit of N2S starts at
\$160. Scubapro 1/8-inch
shorty sport suit in custom
sizes is \$104; White Stag
full-coverage reversible
wetsuit of 1/8-inch N2S sells
for \$67.50.

continued

Right: Submarex two-piece farmer-john suit of 3/16-inch N1S and lycra retails for \$165.

Below right: Aquala drysuit by M&E Marine of full-coverage 1/16-inch rubber sells for \$340.

it becomes more socially acceptable, as well as more effective. The "hooded vest," as it's called, can go it alone or be worn inside a full wetsuit.

A "vest," with or without a hood, is perfect for avoiding the discomfort of those rugged straps most tank backpacks have. A T-shirt does the same to some extent, but a vest does better because it's thicker and stays in place.

Many manufacturers produce a style of wetsuit called the "shorty"—for abrasion protection and some warmth. Originally for keeping the spray off board-riding surfers, they're now worn by divers, waterskiers and even snow skiers (under their snow clothes) to take the chill off. Built with a wide range of sleeve lengths (from long to none), and pant leg lengths (from mid-thigh to none), the one-piece shorty is more comfortable for light protection than a water ski jacket or a wetsuit top with a crotch-grabbing beavertail. Usually it has a full-length zipper in front or shoulder snaps for ease in entry.

If the sleeves are long, the shorty is a "spring suit" for use in chilly springtime water. If the legs are also long, it's a "winter suit" in surfer parlance, or a "jump suit" in diver talk. Without sleeves, the long-legged shorty is a



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"farmer john" in either language.

For surfers, the farmer john is made of thin neoprene to warm legs dangling in the water. For divers, farmer johns are thicker for greater warmth when submerged, most often in conjunction with a wetsuit jacket.

A jacket with pants, either farmer john or waist high, is the most commonly used diver's exposure suit. The one with farmer john pants is warmer over the torso because of the upper part of the farmer johns. Some divers use a vest to accomplish the same, but it doesn't always work as well—it's hard to match three pieces of suit together.

One new solution to exposure is in the "zip-on" suit. Custom-fit suits always provide the highest level of protection because they fit literally skin tight. They are also harder to get into for that same reason. The zip-on suit features a series of pleats—one on each hip, both legs, both arms and one across the chest—which allow the extra room you need to get into the suit comfortably. The pleats are then gathered up and secured by large zippers. Velcro closures around the wrists and ankles minimize intake of water through the pleats.

Another diver's exposure suit particularly popular in colder waters is the one-piece inflatable suit, sometimes referred to as a dry suit, even though it may not be dry inside. Built of wetsuit material with watertight seals at wrists, ankles and neck, it can be inflated with air so the diver can control his own heat loss. Inflating it also moves the fabric away from the diver's body to restrict it less than a form-hugging wetsuit.

In spite of that extra air insulation, inflatable suit material may feel cold to a diver's bare skin. With something like a sweatshirt, or sleeves and trunks, between the suit and skin, the suit can again feel toasty.

Besides the inflatable suit, there's a *real* dry suit for sport divers. A rubber leak-proof one-piece suit sealed at ankles, wrists and face, it's worn over thermal underwear much like a commercial diver in hard-hat diving dress.

And so our survey closes on a variety of exposure suits greatly surpassing that of only a few years ago. The change shows that suit-makers are continuing to design, cut, glue and sew madly to meet every conceivable exposure suit need. Look around and you should be able to find a suit to fit your particular brand of diving exactly. ☺

Profile:

Lloyd Bridges

Conversations with the star of Sea Hunt and the men who first brought compressed air diving into the living rooms of America.



Riding the crest of a record-breaking popularity wave, Lloyd Bridges as "Mike Nelson, underwater investigator" starred in Sea Hunt, a prime-time TV drama rated number one among 175 syndicated series on the air from 1957 to 1961. Here Bridges wades ashore in a scene from one of the series' final episodes wearing, for the first time, a two-stage, single hose regulator.

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BY RO SHEFFÉ

"I'm Lloyd Bridges. Join us again next week for another exciting episode of — *Sea Hunt!*"

Remember the disappointment? That line was the parting shot of one of television's most popular early adventure shows, and it meant we wouldn't see Mike Nelson's underwater exploits again for a week. It was unfair. A week was too long, anything could happen. What if a saboteur slashed his air hose while I wasn't looking over his shoulder

Ro Sheffé is associate editor of Sport Diver Magazine

for him? I was Mike Nelson's buddy. Maybe you were too.

For me and the tens of millions of other kids who were hooked on *Sea Hunt*, it was a responsibility. We held a special respect for the man who taught us about buddy breathing, somersault entries and self-reliance in a dangerous world of semi-darkness and bad guys with knives.

Lloyd Bridges, Bud to his friends and still Mike Nelson to many of us, lightly jogs down the staircase of his Westwood, California home to the interview. He is tanned and fit from world travels on the Pro/Am tennis circuit, still swims a couple miles at a stretch, and will have finished another film for

ABC-TV before his 67th birthday this month. If he is a successful television and film star now, it is because he worked hard for it, harder than most. He paid his dues during the many early years of obscurity and vividly remembers the salad days, the low-budget fiascos, the blacklist that snapped up his name during the rabid McCarthy era. He is vaguely uncomfortable with the overwhelming success that followed *Sea Hunt*, and shuns personal publicity. He seems, in a word, shy.

"I suppose Mike Nelson was a hero of sorts to the kids," Bridges concedes. "The first time I met [producer] Ivan Tors's son Peter, he told me, very seriously, 'Mike Nelson, you're a good man.'

Silt churns and knives flash as millions of Sea Hunt fans inch closer to the edge of their seats, anticipating the outcome of an archtypal Mike Nelson battle with the bad guys. "We never rehearsed the fight scenes," recalls a crewmember. "We'd just say, 'Well, this scene calls for us to scuffle with knives and spearguns,' and then jump over the side. We all knew each other's moves. Mike always wins, of course, but he takes his licks, too."

Ivan's kids used to sit in front of the TV breathing through snorkels while they watched the show."

Kids weren't the only ones. In June 1958, after the show had been only one season in production, *Time* magazine devoted two pages to the *Sea Hunt* phenomenon. *Time* called it "one of the world's most widely syndicated TV dramas." It then appeared on 167 U.S. television stations, was already being translated into eight other languages, and was shown in 20 countries.

Suddenly, people who had never seen a body of water larger than a bathtub knew about double-hose regulators, nitrogen narcosis and the bends. Scuba joined the vocabulary. In two years, diving equipment sales skyrocketed. The first two national certifying agencies were incorporated. And the overriding image in the minds of all those novice frogmen was that of a ruddy Mike Nelson biting his mouthpiece, slinging a pair of double tanks up over his head and rolling into the waves as the suspense music rose in the background. Thumbs up.

It was 23 years ago when a successful writer-producer for MGM named Ivan Tors met former Navy Commander Francis D. Fane. Fane had been instrumental in forming the first Underwater Demolition Team during World War II, and Tors was immediately fascinated.

"The story of the UDTs appealed to me right away. No one had ever produced an underwater adventure series. This was something absolutely new, and I knew the time was right." Hungarian-born Tors, a white-bearded bear of a man who at 63 still produces prime-time TV, hesitates and smiles. "I couldn't have known how right the timing was. On the same day I introduced the idea for *Sea Hunt* to Ziv Productions, British Royal Navy diver Buster Crabbe's mysterious disappearance made world headlines. I knew then what the answer would be."

Tors assembled a crew that, with



COURTESY BROWN

few exceptions, has worked together ever since. A pilot episode was made and turned down by CBS: "Interesting, but how many shows can you do underwater? Maybe two. No thanks." So instead of being sold to a network, the show was syndicated. It ran four years, 155 episodes, and was re-run in prime time for nearly another decade. Between 1957 and 1961 alone it grossed a record-breaking \$10 million.

For Bridges, it was a break, if not the one he was looking for. As a political science major at UCLA in the 1930s, he had appeared in a play attended by the late playwright Sidney Howard. Howard advised Bridges to try his talent in New York, and the aspiring attorney

packed up and left to become an actor.

"It was an exciting time," Bridges recalls. "In New York I worked as a delivery driver for United Parcel Service at night and looked for work during the day. I got some parts here and there, and helped convert an old iron foundry into the first off-Broadway theater.

"Finally, Sidney Buckman noticed me and I made a screen test for Columbia. It was a tough decision. I wanted to do serious stage acting, and I'd just been recommended for a role in Jean Cocteau's *Comedy of Good and Evil*."

Hollywood, of course, won out. Bridges signed a stock contract with Columbia for \$75 a week—good money after the barter-theater years of the Great

continued



In this 1958 photograph, Bridges poses on a rocky coast near Catalina, California where many of the *Sea Hunt* topside scenes were filmed; most of the underwater footage was shot off Nassau, Bahamas and in Florida's Silver Springs. He wears the canvas harness and double-hose, double-tank rig that became Mike Nelson's trademark and introduced a generation of TV viewers to compressed air diving gear.

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others. He was the creature in *Creature from the Black Lagoon*, one of 26 films in which he performed as a stuntman. Cameraman Lamar Boren, still active as a cinematographer, built the 300-pound camera housing used to film *Sea Hunt* and shot many of the underwater scenes in Browning's productions. Cinematographer Al Tillman and Dr. Perry Bivens signed on as advisors for the show. Bivens' wife, author Zale Parry, co-starred in many episodes. Stuntman Courtney Brown, Bridges' double in much of the underwater footage, went on to build a film career spanning 25 years and as many films. Cameraman Jordan Klein became widely known as the creator of Mako compressors. Robert Conrad and Jack Nicholson first appeared in *Sea Hunt* episodes.

"Sure, we had some problems at first," Bridges recalls. "A lot of actors would tell us they could dive, just to get the part, then we'd find out they could hardly swim. I couldn't dive either, until Ricou and Courtney taught me."

Luckily, Bridges was a quick study. "The first time I dived to any depth, in Silver Springs, Florida I wasn't given a full tank. We were shooting a scene at about 30 feet when I ran out of air. I was terrified. I didn't know whether to go for the surface or to Courtney, who was about the same distance away. Fortunately, Courtney got to me and buddy breathed with me to the surface."

But those incidents were rare. Browning's underwater team worked well together because they had to, and out of 155 episodes there was never a serious accident. Courtney Brown remembers why.

"Between scenes we'd horse around down there a lot. We'd grab each other's masks, turn off people's air, cut each other's air hoses. We were always ready for just about anything. We had to be. You should have seen some of the props those writers would dream up — huge barrels, buoys with smoke and wires and chemicals coming out of them, fake

experimental breathing gear — they always had some goddam thing to try to drown us with."

They were a hard-core, thoroughly professional crew, the first of their kind, and shared a pioneering pride in the work they did. It was often cold, frustrating work, some scenes taking days to produce. They were strong-willed, and tempers sometimes flared, but the glue that held it all together was an unquestioning respect for each other.

"We'd bust our asses when Ricou was directing," a crew member says. "He never asked us to do anything he wouldn't do, but he's done it all. If someone was worried about doing a dangerous scene, Ricou wouldn't say a word, he'd just go do it. None of us could say 'no' to him."

Remembering, Bridges leans forward, suddenly serious. "Every man in that crew had a driving interest in doing the best possible job. I've never worked with a better group of pros. The quality of the work they produced was just phenomenal. Courtney made diving a beautiful thing to watch, and Lamar would sometimes refuse to leave the water until he'd gotten a scene down exactly right, the way Ricou wanted it to be shot."

"That wasn't dedication, that was his ears," was Browning's retort when asked about this later. "Once after we'd been shooting all morning, Lamar had trouble clearing his ears. We broke for a half-hour lunch, and he told us he'd just stay down. We brought him another tank and a few pounds more lead, and went up to eat. When we finished, Courtney made a little flag on a toothpick that said 'lunch,' stuck it into a slice of watermelon, and swam it down to Lamar. It was great. He nearly choked when he saw it."

"But we all worked long hours to get what we needed. We were working in the ocean, using available light, and when conditions were right we'd just keep rolling. The only real accident we

Depression. He worked hard, appearing in more than 35 films over the following 15 years. The films were mostly forgettable B-grade productions, but Bridges' performances stood out. In 1956 Tors found him, and Mike Nelson was introduced to the world.

"There was a story going around after the show became a success that, when I signed Bud to star in *Sea Hunt*, I forgot to ask him if he could swim," Tors scoffs. "It's not true, of course. I had seen him in a film he'd done, in a role as a treasury agent or something, and he swam in a couple scenes. He was a strong swimmer. He looked very good in the water."

Bridges was cast as "Mike Nelson, former Navy UDT diver turned underwater troubleshooter," and the wheels of production began to spin. The crew Tors recruited reads today like a Who's Who of underwater film production. Director Ricou Browning, recruited from a public relations position at Wakulla Springs, Florida went on to direct 17 films including *Thunderball* and *Flipper*, and more than 270 television episodes of *Sea Hunt*, *Flipper*, *Gentle Ben*, *Primus* and

had was a result of that. We'd been shooting in Nassau all day at about 30 feet, going up to the boat and back all the time, and just before dusk the sharks we'd been looking for all day showed up. We worked fast and got some good footage, but weren't watching the tables like we should have, and Courtney got bent. We flew him to the Navy recompression chamber in Key West and he was all right, but we were a lot more careful after that."

Tors remembers that incident, and the effect it had. "I think Ricou felt worse about it than Courtney. He is a fanatic about safety, and cares deeply about the people he works with. We were shooting a scene once with an anaconda. Bud was supposed to struggle with it, then pass out as the snake began to strangle him. We rolled the cameras, and as soon as Bud's head dropped forward Ricou was on him with two safety divers. It was a fine tribute to Bud's talent, but he ruined the scene."

To appreciate what they were up against, it has to be remembered that this was 1957, and state-of-the-art diving equipment was bulky, uncomfortable and unreliable. They used stiff, round masks and heavy Churchill fins. The huge, tank-mounted regulators breathed hard in an upright position, flooded if turned any other way, and required a complicated little gymnastic routine to clear. Those twin steel tanks Bridges so nimbly, and so often, tossed up and over his head weighed more than 75 pounds. ("It wasn't until the second year that we had balsa mock tanks built for the topside scenes," Bridges recalls, wincing.) Backpacks and BCs were non-existent, and tanks were strapped on with rough canvas harnesses with brass rivets and buckles — plenty of slop, and guaranteed to chafe.

"My tank was a converted CO₂ fire extinguisher," Courtney Brown remembers. "It was so heavy my knees dragged on the bottom."

But one of the most persistent

problems had nothing to do with the hardware. If there weren't more than a handful of actors who knew a tank from a regulator in 1957, there were fewer writers who did. Some of the earlier scripts threatened to turn Tors's new adventure show into a comedy.

"*Sea Hunt* was a success almost immediately, and I told Bud I'd arrange a limousine and private dressing room for him," Tors recalls. "He came up to me, furious, waving this script in my face, and told me, 'Look, Ivan, forget about the limo and dressing room. I can ride the bus like everybody else. Save your money and just get me some good lines.' He went off and worked all night re-writing the script.

"You know, I've worked with thousands of actors but never anyone who was better with a script than Bud. He had to narrate about 15 minutes of underwater footage for each show, and out of 155 episodes I can't remember once having to do a second take."

Browning agrees. "Some of those scripts were really foolish; the writers just weren't very well acquainted with diving at all. They'd have us diving to a thousand feet, doing impossible things. It was ridiculous. But Bud is a truly professional actor, not just one of these hot-rods. A lot of actors complain about scripts, but he'd do something about it."

It was more than a peeve. Bridges had developed an affinity for the role — surprising, since he'd been reluctant to accept it in the first place. But as the series progressed, and the writing improved, Mike Nelson began to emerge as a distinct personality. He seemed affable enough, soft-spoken and sincere. But the nature of his job, something of an underwater private eye, demanded a set of values that set him apart from his clients — both good and bad. He combined the Code of the Old West with modern technology and gave us a new American hero to challenge a new frontier. It was a big ocean out there and a man had to rely on himself and his gear,

know the ways of the wild, and be able to defend himself against tall odds. He was a man of action — just the prescription for a generation born to bomb shelters and vague, unseen enemies. Mike Nelson's enemies were tangible and immediate, and when he came to grips there was never any doubt of the outcome.

"I'd have to admit that Mike Nelson's values in many ways paralleled my own," Bridges says. "And I was proud of *Sea Hunt*. We took care to make the script as honest as we could, and I think it showed. Mike Nelson was someone the kids could look up to, and I kind of miss that. In a way, *Sea Hunt* was a lot like the old Westerns — they shot people, but only in self-defense, and there was never much bloodshed. It wasn't like TV today. I'm very proud of the fact that no one was ever killed in a *Sea Hunt* episode.

"But after four years I wanted something more. I greatly admired the early work of Jacques Cousteau, and I'd like to have seen *Sea Hunt* tend in that direction, increasing the awareness of the oceans' mysteries. I've since worked with dolphins, and it's just such a great feeling being around such unusual beings — a feeling of friendliness, of real happiness."

He says he doesn't much care for television programming these days, for hollow sit-coms and game shows. Is there room for scuba in today's TV marketing plan?

Producer Tors thinks so. He went on after *Sea Hunt* to earn a master's degree in zoology while producing *Flipper*, *Daktari*, Lorne Greene's *Last of the Wild*, *Elephant Country*, *Gentle Ben* and many others — and may have further surprises up his sleeve. Among a number of projects slated for next season is an "underwater comedy" he is preparing for Universal, and there is talk — very guarded talk — of a Loch Ness special.

Ricou Browning and crew are filming underwater sequences for what may

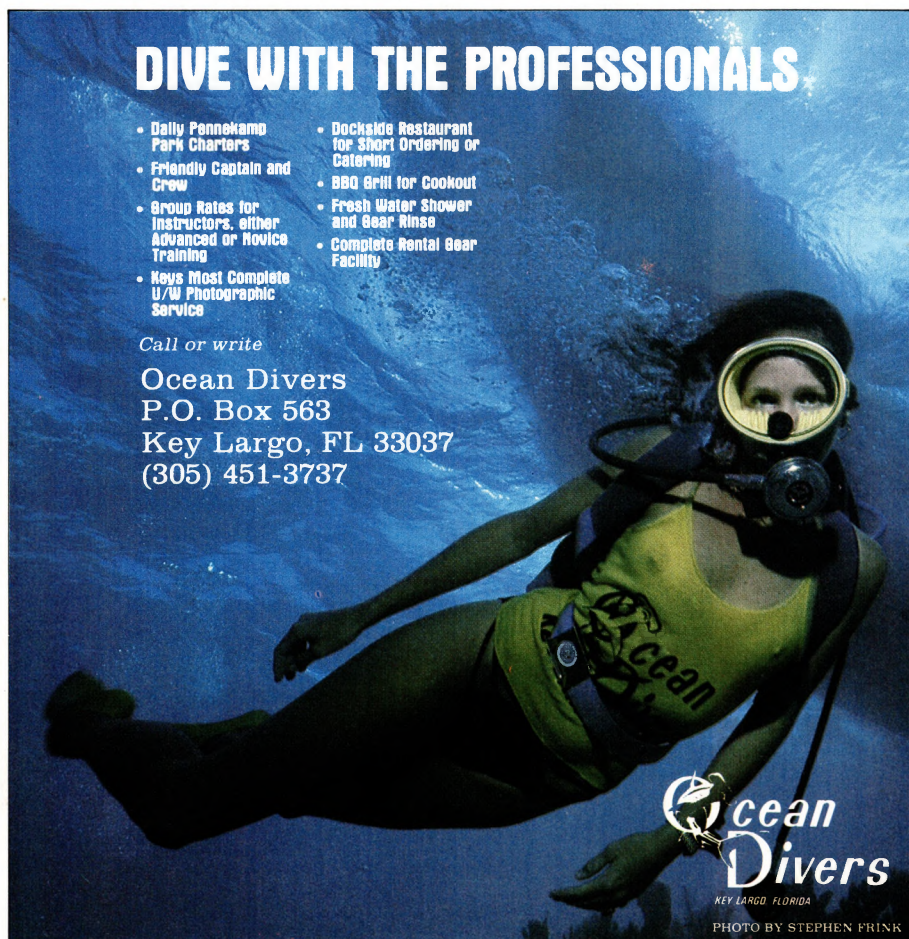
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PHOTO BY STEPHEN FRINK

LLOYD BRIDGES *continued*

become another box-office blockbuster, *Raise the Titanic*, due for release sometime this fall.

"TV stinks now," Browning reflects, "and I really believe there's a market for more underwater adventure shows. Not necessarily similar to *Sea Hunt*, but just honest, dramatic action shows. One thing *Sea Hunt*'s success pointed up was the fact that, if you let Mother Nature be the heavy, you can't go wrong. It's an old theme, one of the oldest, but still one of the most fascinating."

After *Sea Hunt*, Bridges' career diverged from the sea. He had become a sought-after dramatic actor and, aside from an underwater special now and then, he never went back. But his professional involvement with diving has been replaced by a purely personal one. He has logged more bottom time at dive resorts than film sets and, at 67, still dives with the quiet self-assurance Mike Nelson made famous.

"Last year we stopped off in Fiji on the way to a tournament, and I couldn't wait to get in the water. I should've known better when the dive guide showed up. There were three of us, but he only had enough gear for two, and what he had was in pretty rough shape. I just pulled on a mask, snorkel and fins and jumped in. The others used the tanks. About half an hour later I was snorkeling about a mile from the boat, thoroughly enjoying myself, when I heard someone yelling for help. It was one of my traveling companions, out of air, with no BC, struggling a few hundred yards away. Luckily I was able to get to him before he went under, free his jammed weight belt, and swim him back to the boat." He is frowning now, concerned, speaking not of himself but of the others, and there is no hesitation as he continues. "That guide was still down, hadn't missed him. The guy hadn't even given him a snorkel. Can you imagine that?"

He is animated now, gesturing with an enthusiasm that sweeps away the deep facial creases and makes him appear a much younger man. "I've been diving for 23 years now, and each dive is a new experience, completely absorbing."

It's obvious he is in love. I can almost see the salt water clinging to the bushy eyebrows, dripping from a lock of sandy hair. "The sea never ceases to intrigue me. I've dived Pennkamp, the Florida Keys, all over the Caribbean. One of the most awe-inspiring sites I've

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ever seen was off Grand Bahama Island, diving with people from UNEXSO. There are a series of caves at about 80 or 90 feet that are just astounding. Have you been there? Incredible place. Warm water. I really don't like wetsuits."

The sport has come a long way since a 44-year-old Lloyd Bridges first strapped on a galvanized tank in the spring of 1957. He's watched a handful of curious pioneers grow into a worldwide following of almost three million certified divers. Shining aluminum tanks, easy-breathing regulators and micro-electronic wrist computers have replaced the awkward double-hose rigs of the 1950s. Diving equipment manufacture has matured from a few machine-shop operations into an industry approaching \$100 million in annual sales.

But Bridges sees other trends, more disturbing ones, and he is worried.

"I don't think we realize what we are doing to the oceans and, in the process, to ourselves," he says. "There are places not far from here where I used to swim as a child. It's not something you notice right away, but there has been a gradual lessening of visibility over the years and it's directly attributable to pollution. I'd say, in places, visibility is less than half what it used to be. They're using the ocean as a dump for sewage, chemicals, nuclear waste — it's awful. They're just not thinking of the long-term effects, or they don't care.

"If industry won't stop the abuse of our oceans, the federal government will have to. We need a President and a Congress that realizes if we don't do *something*, and soon, we're just not going to have a very beautiful world any more."

He pauses, frowning, groping for words that fit his outrage. But they don't come and Bridges slumps back in his chair, silent for a long moment, perhaps wishing the whole scenario were a script he could rewrite, a scene he could retake. After two decades of intimacy with the sea, it's a scenario he knows too well. He looks out across the veranda to a tiny bonsai centered on a glass tabletop and speaks again, more quietly.

"You know, I'd like our children to be able to enjoy the oceans, too. But we'll soon reach a point where all the damage we've done is just not reversible, no matter how good our intentions. It's a truly frightening thing. And we damn well ought to do something about it."

Mike Nelson couldn't have said it better.



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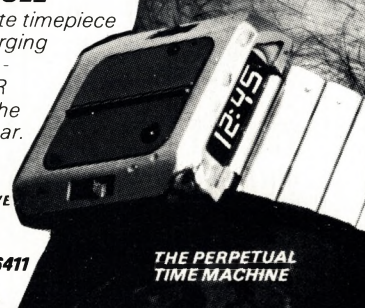


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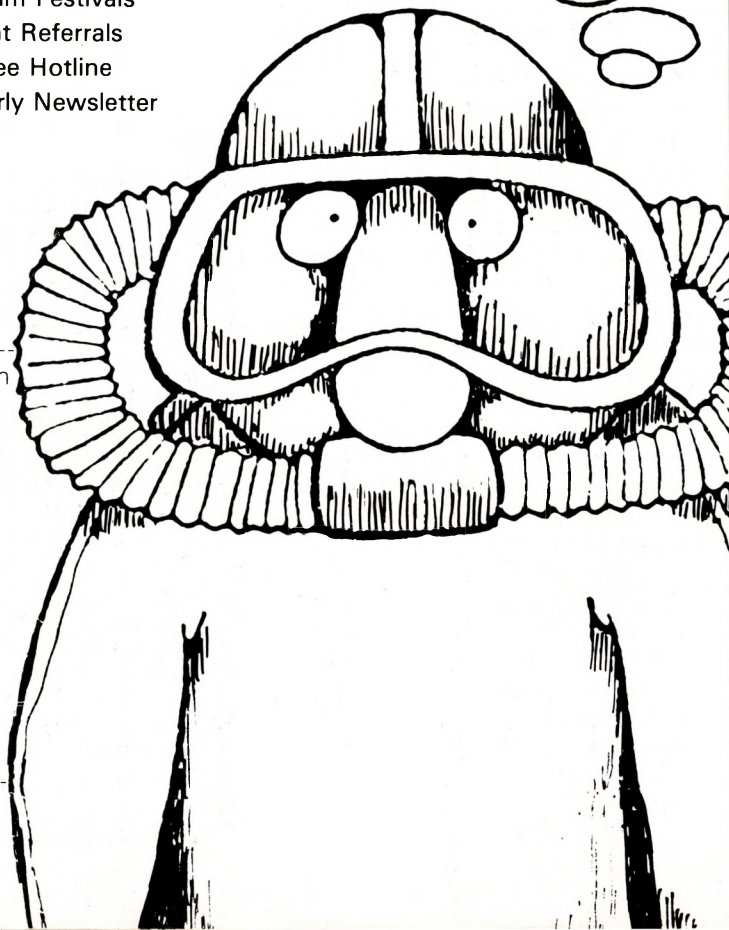
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Salvaging the Past:

Spanish Cannons for Pennekamp Park

With some help from its friends, the State of Florida has recreated a wreck using artifacts just recovered from the 1715 Plate Fleet.



BY DEE MOSTELLER
PHOTOGRAPHY BY
FRED BAVENDAM

Sometime late in July of 1715, before the National Weather Service was around to plot and identify tropical storms, a powerful, no-name hurricane whipped itself into a frenzy and jumped on the central east coast of Florida. It is believed this unpredicted fury caught an 11-ship Spanish fleet, bound for the motherland with Mexican gold, and dashed it to pieces on the shallow reefs near what is now the Ft. Pierce - Sebastian area.

Within 24 hours, according to speculative accounts, the first treasure hunt-

ers — Indians and, possibly, renegade Spaniards — joined the survivors in the recovery effort, followed shortly by legitimate salvagers representing Spain and the ships' owners. Apparently, all but two of the Plate Fleet ships were found and stripped of their cargos.

In a time devoid of hydraulics and fancy buoyancy techniques, the broken bones of the ships and the heavy ferrous items — anchors, tools and the massive 2000-pound cannons that had proved so ineffectual against this final enemy — were left as they lay. For more than 200 years they went untouched, except for an occasional hopeful gold-salvage expedi-

Dee Mosteller and Fred Bavendam are regular contributors to Sport Diver.

continued



DEE MOSTELLER

tion, the beams turning to clay and the cannons fusing into the living reef.

Now history, both natural and man-made, has recycled itself to create one of those quirky little threads that run through the life pattern. Two-and-a-half centuries later, we find the eternal triangle of treasure hunters, government salvagers and hurricanes competing for the remains of the 1715 fleet.

On August 15, 1979 what was described as an "unprecedented union of governmental, civic and corporate resources" kicked off a program designed, in effect, to salvage the past for the future. Officially called the "Cannon Recovery Program," it was an effort to raise, preserve and replace part of the remaining weapons from that ill-fated voyage in a spot where "The Public" — opined by many to be the rightful owners of the cannons — can view them *en masse*.

Before the month, and the actual recovery process, were over, the salvagers, working for the State of Florida, had to contend not only with treasure hunters testing the legality of state antiquities laws, but also a hurricane named David. The year's worst storm, ignoring the nether end of Florida, ravaged the Ft. Pierce area, leaving the work site in a state of turbid, restless, surging and totally impossible waters.

Despite these well-precedented

Preceding Page: Associated Marine Institute divers prepare to attach chain lift harness to a coral-encrusted Spanish cannon. Left: AMI students Raymond Brewer and Lemule Williams secure one of two lift-tank "sharks"—modified aircraft fuel tanks—to the stern of RV Noa's Ark for the morning's run to the work site. Below: A snorkeler discovers the recreated wreck site shortly after the artifacts were displayed in the swimming area of Pennnekamp Park. Right: Gently lifted free of its resting place, the cannon is steadied by divers before completing its ascent.



STEPHEN FRANK

Where To See the 1715 Cannons

A unique, hands-on underwater display depicting an actual early shipwreck site has been established in a public swimming area of the John Pennnekamp Coral Reef State Park near Key Largo, Florida.

The display, utilizing 14 of the 1715 Spanish Plate Fleet cannons recovered from the Ft. Pierce area, lies 50 yards from shore in six to eight feet of fairly clear water in a Largo Sound swimming area. The protected, roped-off pool offers easy beach access to swimmers, snorkelers and scuba divers, according to Park Superintendent Jack Gillen.

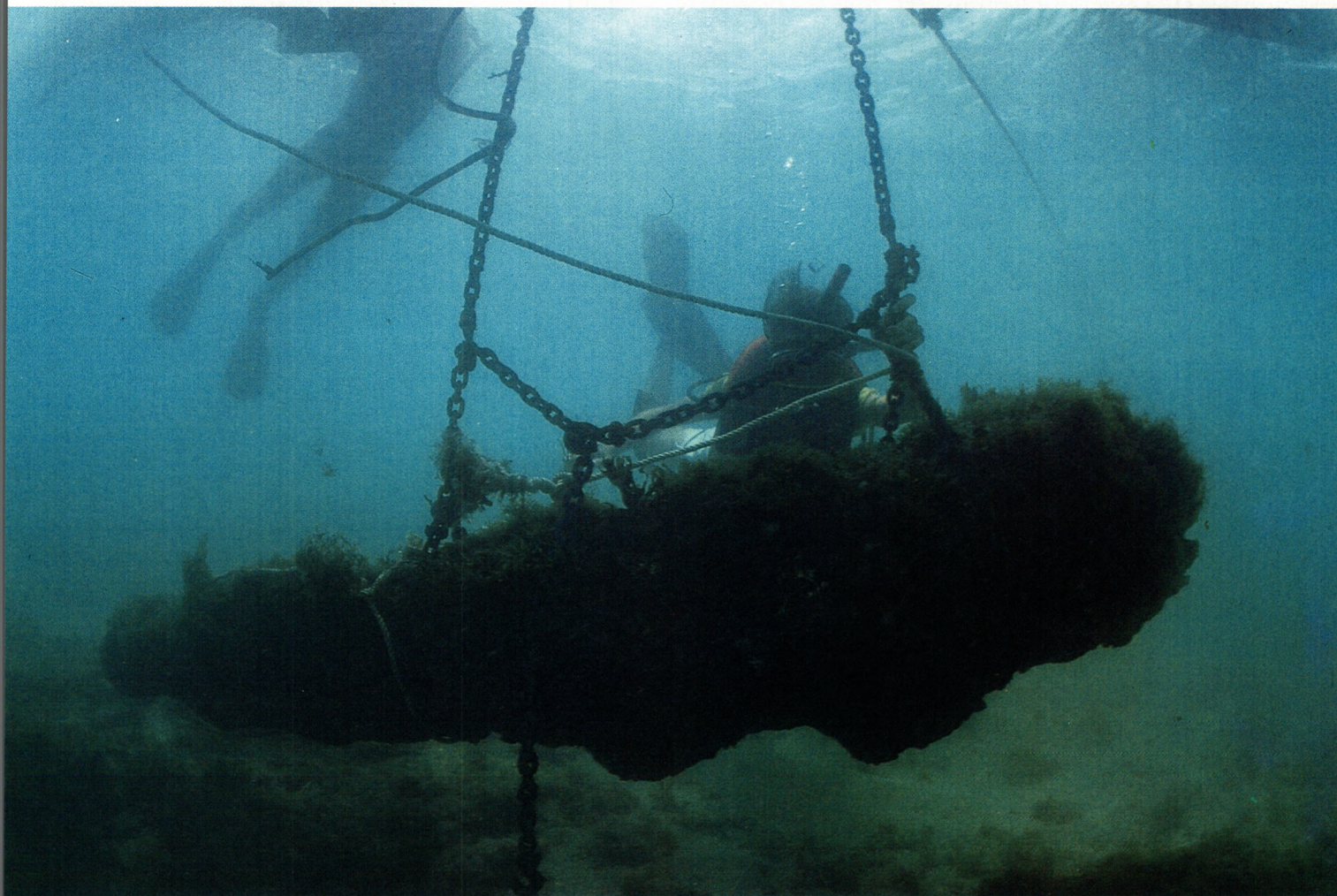
Four more of the cannons will be put on display by Sea World, the sole corporate sponsor of the cannon recovery program, in its large marine life facilities around the country. The cannons will be put in authentic-

looking settings in the giant salt water aquaria at Sea World in Orlando, San Diego and Cleveland and the Shark Institute in the Florida Keys.

With the relatively small amounts of seawater available in the aquaria — approximately 600,000 gallons which are constantly recycled — the cannons must be flushed for two to three months in distilled water as part of the preservation process.

Sea World personnel estimate that these displays will broaden the audience for the cannons to a total of several million each year.

Even more Americans will possibly get to see the cannons in a few months. Sea World photographers filmed the entire project and plans are to produce an hour-long documentary on the cannons for the Public Broadcast System to air in 1980.



problems, 14 of the big cannons were brought up, inspected, used as a source of historic data, put into a state of arrested deterioration and moved to a public site — the John Pennekamp Coral Reef State Park near Key Largo — where they were fashioned into a reconstructed shipwreck for swimmers, snorkelers and divers to see, touch and enjoy. The Cannon Recovery Program has become a model case history of why and how antiquities can and should be saved. It is also a good example of how a conglomeration of seemingly diverse interests — from big business to government to environmentally concerned civic groups to individual sport divers — can cooperate in an effort of this type.

Florida's cannon program was begun, for a number of reasons, by two energetic young men in the state's Division of Archives, History and Records Management — archaeologist W.A. "Sonny" Cockrell and conservator Curtiss Peterson.

The main reason was the fact that the cannons — by definition located on pub-

lic lands, within the three-mile limit of Florida's offshore waters, and, therefore, by law (Chapter 267), property of the state — were rapidly disappearing. According to Peterson, there were 232 mapped cannons 15 years ago. Last year a survey showed that 65 remained. This year, two of those are already gone.

As Cockrell, also the administrator of Florida's historic shipwreck program, said, "These cannons are an important resource [in terms of both historic and intrinsic values] for the people of this state. And that resource was being depleted . . . literally, while we watched. I just happen to feel that it is both immoral and improper for us to sit back and wave them goodbye."

Peterson said the 1715 Plate Fleet had been mapped by the State Department as early as 15 years ago, and had been worked by private salvors, including the Real Eight Corporation, under contract to Florida since 1964. "So, everyone has been aware that those are state sites for a long time."

During the Cannon Recovery Pro-

gram, on the day that *Sport Diver* visited the work site, an agent of treasure hunter Mel Fisher took one of the mapped 1715 cannons in what was believed to be an attempt to put the antiquities law to a court test in order to open up the sites to non-contract salvors and set some significant legal precedents. The agent, and subsequently, Fisher were duly arrested, released on bail, and were preparing court appeals at press time.

The cannons began to disappear in the early 1960s when gold fever was triggered by the discovery of coins and other artifacts along the wreck-strewn Florida Atlantic coast. The hunters were mainly after gold, but soon discovered there was also a fairly lucrative market for other things, which were more readily available to salvagers than the big prizes. Many of the cannons were lying in plain sight on top of reefs in just six to nine feet of water. "Sport divers had been looking at these things for years," said Peterson, "and just taking it for granted that they'd be there to look at forever. They were wrong."

continued



Suddenly cannons and anchors began to appear in the lobbies of local hotels and motels, on courthouse lawns and entrances to seafood restaurants.

Technically, Cockrell admits, these artifacts are on public display. "But how many people are going to get to see them at a local chowder house, as opposed to a public museum or park?"

The biggest problem, said Peterson, who deals in the preservation of archaeological objects with a vengeance, is that the pieces in private collections are heading for near-term self-destruction. "Metals are a high-energy form, and at every opportunity they gleefully seek to slide down toward dynamic equilibrium and become oxides, or rusts.

"Cannons, for example, are high-maintenance items even when new. And these have been virtually ignored in a very hostile environment for two centuries. Some have corroded down to about half their original thickness in just 264 years . . . This in an area of low energy and oxygen levels with practically constant temperature which slows the deterioration process considerably. In the open air, they'll turn to piles of rust in 20 or 30 years if they aren't put through an expensive conservation process.

"So, nobody is going to be able to see them soon."

These were the reasons that prompted Cockrell and Peterson to decide to save the cannons.

Armed with the results of the latest survey, Peterson approached Florida Sec-

Free of its salt-water surroundings for the first time since 1715, a 2000-pound cannon is rushed by forklift to be packed in wet sand for its journey to Pennekamp. After emplacement in the park, anodes attached to the gun will minimize further corrosion.

retary of State George Firestone, a noted lover of the arts, with the proposal that the more exposed (thus, more vulnerable) cannons be removed to Pennekamp where the world would be free to see them, and where they would be under the eye of law enforcement officers.

The plan fit neatly into a broader program that Firestone, who campaigned for office on a cultural affairs platform, had already instigated. Under his direction, the state — in order to "put as many of our artifacts as possible into the hands of as many people as possible" — had begun to construct a series of traveling exhibits available free to museums and historic societies, the latest being based on shipwrecks. The Cockrell/Peterson plan not only provided a way to increase the visibility of the cannons, but also a method of extrapolating smaller objects, like cannonballs, and historic data for the shipwreck exhibit.

Further, the plan offered the perfect pilot vehicle for another program Firestone had in mind. That is, to obtain fi-

nancial and other practical assistance from private enterprises for State Department cultural activities of this sort. If the Cannon Recovery Program proved successful, he could pursue such projects as a continuation of the Warm Mineral Springs prehistoric excavation (see *Sport Diver* Vol. 2, Second Quarter 1978), another deep-water spring archaeological program in northern Florida, shallow-water Indian sites on the west coast, and a survey of the Jean Ribault fleet shipwreck near St. Augustine.

Firestone himself took the Cannon Recovery Program to big business, in the form of Sea World of Orlando, the local division of a marine life park group headquartered in California.

It took Sea World's Marketing Director Dick Howard, less than 24 hours to decide to help with the project. "It was," said Howard, "right in line with a number of our basic philosophies.

"One, it gave us the chance to participate in Florida affairs as a good corporate citizen, which we feel an obligation and a desire to be.

"And the idea of a reconstructed shipwreck, with real artifacts, just sparkled to me. Our own displays are based on total authenticity; so this idea was really appealing. Besides, moving the cannons to Pennekamp opened the potential audience from a couple of hundred divers each year to hundreds of thousands of people.

"Plus, it gave us the right to obtain cannons for our own displays."

As part of the program, Sea World may be permanently loaned cannons to be displayed at its four parks. For approximately \$10,000 in cash and \$5000 in services and equipment, Sea World bought itself the use of four cannons (at a price about two or three times more than the black market value), and gave the State Department the wherewithal to go ahead with the Spanish cannon recovery program.

Manpower and work boats were made available through the Associated Marine Institutes, a group of seven non-profit, marine-oriented education/rehabilitation facilities that work with juvenile delinquents throughout Florida. AMI quickly rounded up professional divers from its many staffs, headed by O.B. Stander of the Tampa Institute, and a group of master divers from its collective student bodies. An ancient work boat, donated to AMI of Miami by NOAA, and appropriately dubbed *Noa's Ark*, was brought up to Ft. Pierce.

Florida Institute of Technology's School of Marine & Environmental Technology in nearby Jensen Beach pitched in with low-cost room and board for the AMI work crew. Pennekamp Park Superintendent Jack Gillen was asked to select a spot for the reconstructed shipwreck, and Keys area dive operators were enjoined to help monitor the site after its completion. Originally the plan was to place the ship artifacts on one of the much-dived Pennekamp reefs, which would have indirectly benefited the dive boat operators by introducing a new attraction for scuba enthusiasts, but would have been difficult to police. Gillen later selected the close-by swimming area because it affords access to many more people, and is within the state's three-mile limit, and, therefore, easier to work and to protect from anyone who might be a potential cannon thief.

The final touch was to recruit a corps of local sport divers to help move the cannons at Pennekamp and to locate and place ship ballast rocks on the site to help add to the authenticity of the underwater exhibit.

"It was amazing how it all came together," said Cockrell. "This is exactly what we are aiming for . . . to be able to do the survey and data processing work on a site like this, and then let private and local interests work with them and benefit from them."

Somehow the wheels of this complex organization creaked to a start, and the

continued

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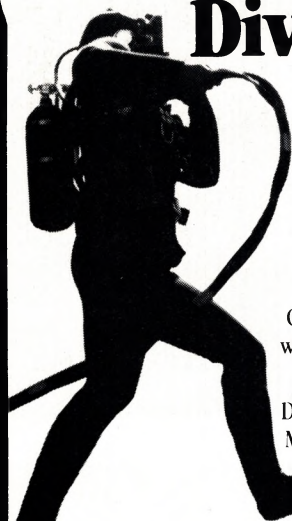


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SPANISH CANNONS *continued*

slow cannon recovery process began.

"It isn't easy to work with cannons like these," said Peterson, who personally supervised the field operation and blew his entire annual budget on it in the process. "They're completely negative, with a gravity factor of about eight. They for sure don't float; nor do they sink gently to the bottom if dropped. They fall like a truck in air and if they fall on a body, well, you know."

The cannons are also well protected by a hard, rough growth of coral and rocky substances which are hard on a diver's hands, arms and legs. Indeed, they blend so perfectly into their underwater environment that the critters accept them as home. While we watched a cannon being taken, a tiny, territorial damsel swam around and around, literally under the divers' feet, watching with extremely hostile eyes as her house/restaurant/playground was wrenched away.

"One of our main objectives is that everyone comes home whole from this project," Peterson said.

Also, in order to protect the historic investment, the cannons must be freed from their tight settings very carefully by hand, the encrustation chipped away slowly with small tools. All the while, the water, even in non-storm times, ebbed and flowed angrily over the shallow reefs, keeping the working atmosphere constantly roiled up.

Noa's Ark at first was thought not to be strong enough to support the cannons on its deck (later this proved false), nor could its small winch free and lift them. So other methods of recovery had to be devised on the spot.

The solution came in the form of two large surplus Navy aircraft fuel tanks which were modified with simple intake valves to be used for lifting and moving the heavy guns. Whimsically painted with little beady eyes and grinning mouths full of pointy teeth, the two oblong cylinders were immediately named "The Sharks," and attracted curious stares as they were towed to the work site each day by the *Ark*.

The cannons, previously plotted and marked by archives field agents, were worked by AMI professional divers, while the youthful assistants drove the boat, ran machinery and generally helped out in the water.

Once a cannon was mostly free of encrustations, one of the Sharks was sunk directly above it and fastened to it by chains. A tiny compressor on the *Ark*

would then pump air into the tank, which would begin to head for the surface. One of the irresistible forces had to give, and with its superior 3200-pound lift capacity, the Shark invariably won. The cannon, with a reluctant roar and mighty surge of water, would let go of its long-time resting place, and rise beneath the tank to hang like a hoary trapeze beneath the white belly.

The process of retrieving a single cannon could take all day, with anywhere from four to eight divers involved. At the end of the day, the *Ark* would lumber back to port, dragging the Sharks and their loads behind.

From the salt water environment, the cannons had to be moved quickly to a Department of Transportation facility where they were stored in wet sand. This process not only prevented them from drying out, but also kept oxygen away from the metal, Peterson explained.

Core samples were taken from some for use by state archaeologists in determining such information as the type of iron used for weapon-making in Spain in the 1700s and the degree of skill in the workmanship of the day.

From Ft. Pierce, the cannons were transported, in their sandpicks, to Pennekamp. In order to arrest the corrosion process, sacrificial alloys — aluminum anodes — were attached to each of the weapons. "These provide a massive voltage difference to overpower the little corrosion cells that are already there," said Peterson, "so the anodes will corrode preferentially to the iron."

The shipwreck reconstruction process, with hurricanes Freddie and Gloria threatening constantly to stomp on Pennekamp, was almost as slow and difficult as the recovery itself. Divers, technicians, park rangers and machinery had to be orchestrated into one giant week-long production. "Again," said Cockrell, "this is one of the things we strive for. That is, to involve non-archaeologists in what is basically a scientific program, with the proper supervision. It works like gangbusters... and we're always eager to have volunteer sport divers help us out."

Thus, the 1715 fleet — or, at least a few of the meager remaining cannons — is again at rest in a watery home. This time where The Public — and the law — can see them.

"We look at it this way," said Gillen, "we're simply storing and protecting history for the future."

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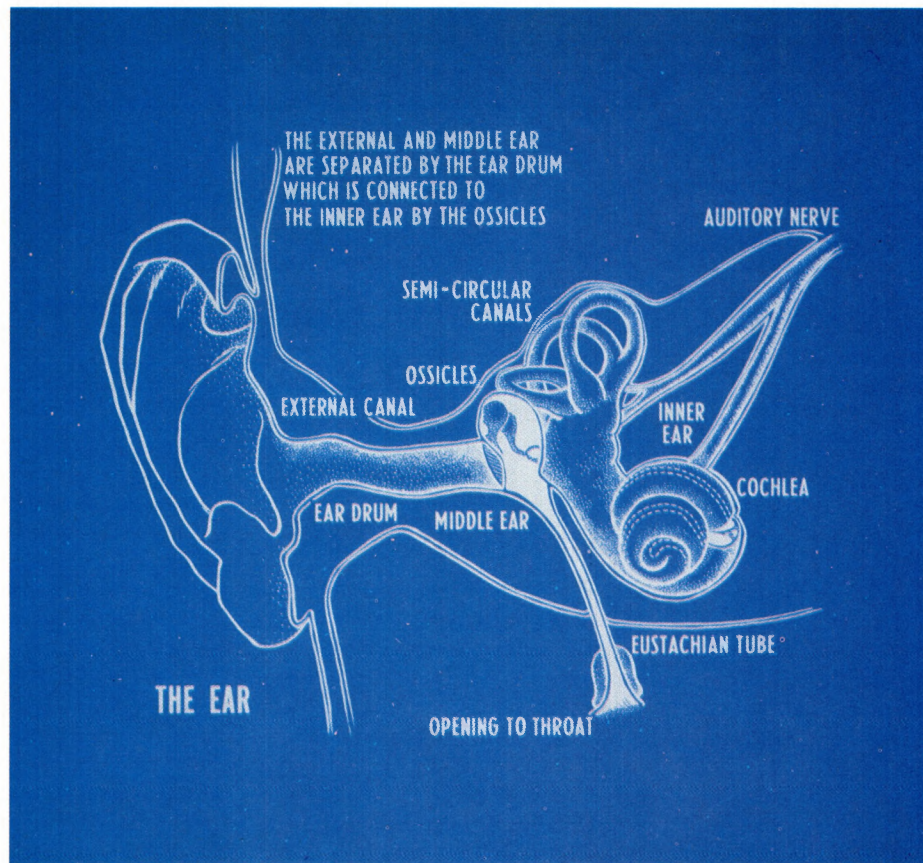


Basic Instruction:

Ear Clearing: Quick and Painless

*Clearing your ears does not have to be an ordeal by fire.
There is a painless way to equalize and prevent ear-pressure accidents.*

BY BRUCE BASSETT, Ph.D.



The ears present more problems to the diver than virtually any other part of his body. Certainly there are more dramatic physiological problems such as air embolism, decompression sickness, hypothermia, nitrogen narcosis and oxygen poisoning, but the ears remain the most persistent pests to the diver.

The most common diving problem, physiologically speaking, is middle ear

squeeze: that feeling of fullness in the ears when you fail to clear or equalize the pressure in the middle ear to that of the outside water pressure. Failing to properly clear your ears can endanger your dive, your health or your life. To understand the squeeze and other ear maladies, it helps to know the structure of the ear.

Anatomy of the Ear

The ear is divided into three parts. The outer ear includes the external structures and the ear canal leading to the eardrum,

a relatively thin, yet durable, membrane separating the outer ear from the second part, the middle ear. This air-filled cavity contains the bones of conduction which transmit the vibrations of the eardrum caused by sound waves to the inner ear, the third part of the human ear. The Eustachian tube, of vital concern to divers, connects the middle ear to the back of the throat and the outside world. The inner ear consists of several highly specialized structures, all fluid-filled, contained in a bony labyrinth, which control hearing and balance.

Dr. Bruce Bassett is a lieutenant colonel and chief of hyperbaric research at the Air Force School of Aerospace Medicine.

continued

A normal, undamaged eardrum looks like this from the outside. The slight bulging does not indicate an ear problem.

External Ear Problems

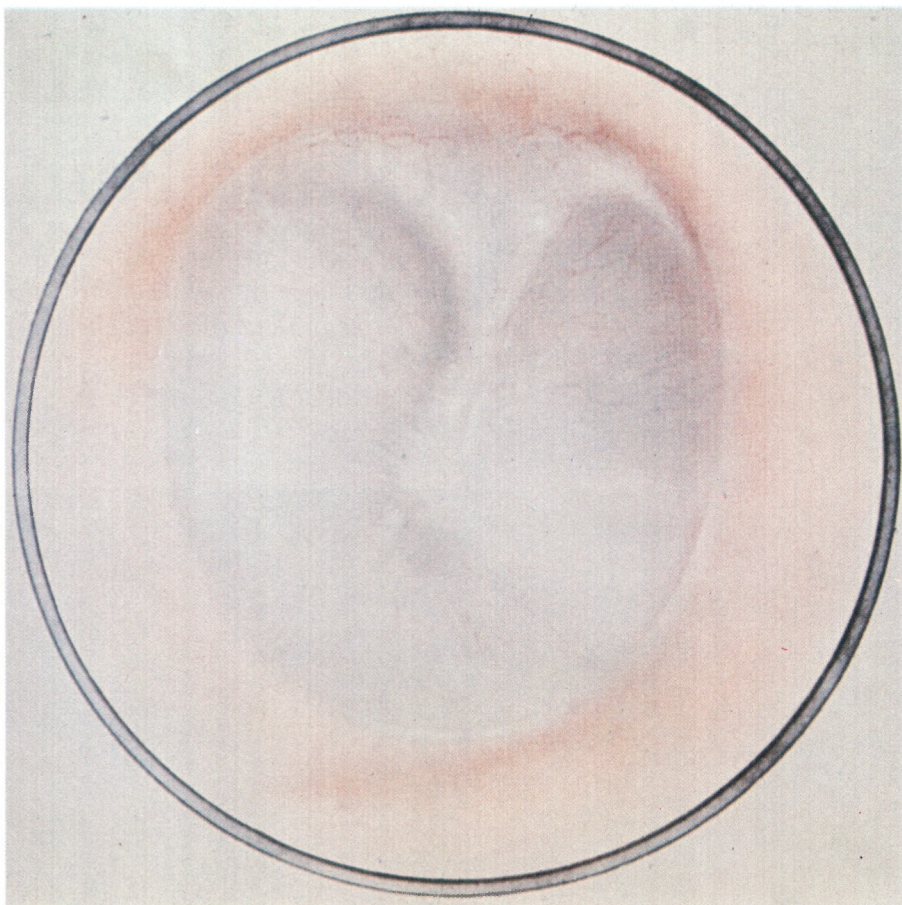
The more you dive, the better your chances of someday getting *external otitis* or Swimmer's Ear. This is an infection in the ear canal lining which can range, depending on severity, from itching and crusting to pain and excretion of fluid. It can occur from exposure to chlorinated pool water, river or lake water or ocean water. Divers vary in their susceptibility to external ear infections, but frequent exposure to water, high humidity and warm temperatures are contributing factors as seen in the high incidence in the tropics and saturation diving.

A diver who develops symptoms of Swimmer's Ear should visit a physician, preferably an ear, nose and throat specialist, for treatment. The usual treatment is use of an antibiotic solution for seven to 14 days and keeping the ear absolutely dry — sure to ruin a diving vacation.

Prevention is easy and painless: Irrigate ear canal following each dive/swim with two percent acetic acid in aluminum (Domeboro solution, Dome Laboratories). Acidic conditions prevent bacterial or fungal growth. Dry *outer* ear following irrigation, but never use cotton swabs to dry ear canal. Following this procedure will guarantee your trip won't leave you high and dry.

Middle Ear Squeezes

The most common problem in diving is the inability to raise the air pressure in the middle ear cavity to offset the water pressure on the outside of the eardrum during descent. The middle ear will not equalize automatically so every diver must make a positive effort, and the best time to start is on the surface. The Eustachian tube functions like a one-way flutter valve (see diagram) and is normally closed, particularly at the throat. The tube acts like a soda straw with the end pinched closed. The more you draw on the straw, the more it collapses. Thus as more negative pressure builds up in the middle ear, relative to the outside



water pressure, the tube seals off tighter unless mechanically opened.

Preventing Ear Squeeze: Equalizing

Divers use a variety of methods to equalize their ears: jiggling their jaws, swallowing or snorting into the mask. The most popular method is the Valsalva maneuver, named after Antonio Valsalva, an 18th century anatomist. It consists of pinching off the nostrils, closing the mouth and attempting to exhale or blow out. If done properly, very little effort is required. The pressure needed is 6 to 70 mmHg, with a mean of 30 mmHg. (0.12 to 1.35 psi, mean 0.58 psi which equals the pressure of 1.3 feet of sea water). While the procedure sounds simple, there is a technique which must be mastered and is difficult to describe, for the trick is to open the Eustachian tubes at the same time you raise the pressure in the oral-nasal cavity by blowing against a closed mouth or pinched-off nose. The maximum pressure which can be produced ranges from 50 mmHg to 230 mmHg (0.97 psi to 4.44 psi), and all that pressure is no use if the tubes remain closed. The tubes are

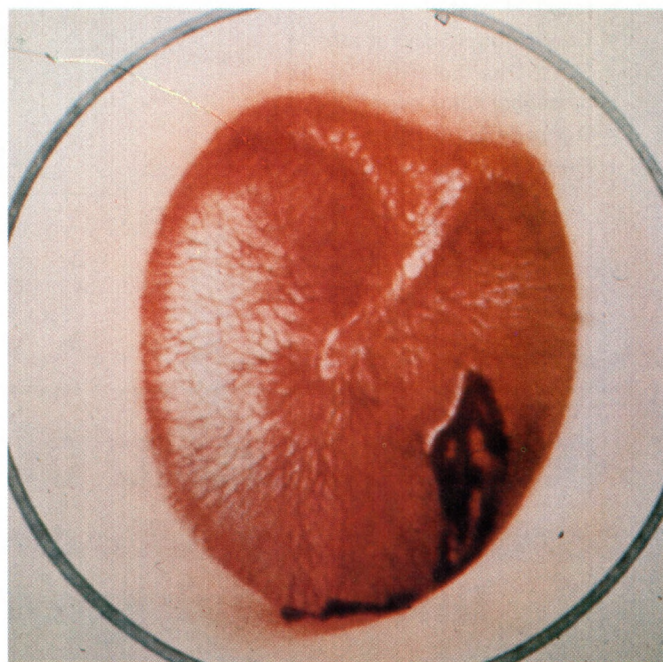
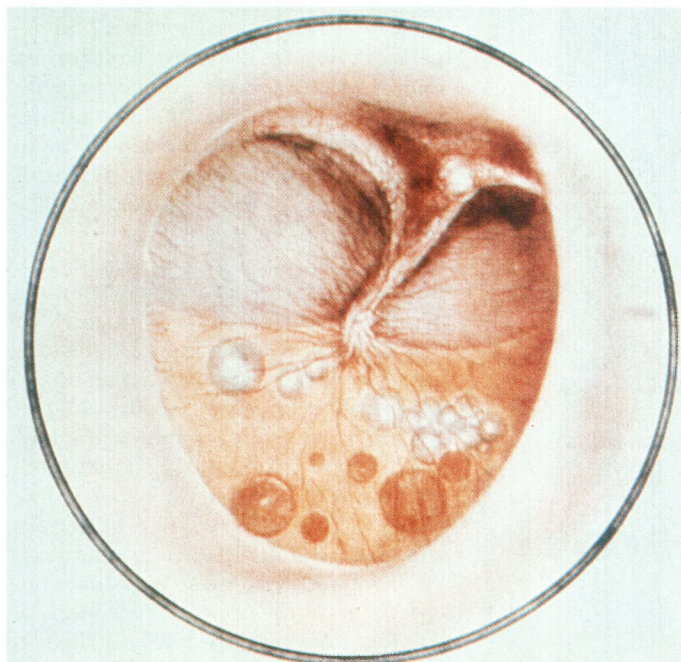
opened by constricting muscles in the throat, which is why jaw movements or swallowing works for some divers. Those who have learned to voluntarily control these muscles are the ones who descend with comparative ease.

Tips on Equalizing

First, check your Eustachian tubes before a dive. With a Valsalva maneuver performed at the surface, the diver should feel a slight pressure or fullness in *both* ears. A physician looking at the eardrum with an otoscope would see them bulge outward slightly with this procedure. The full sensation or pressure should then be relieved by swallowing or yawning. If one ear equalizes and the other doesn't, try again and tilt your head toward the shoulder opposite the unequalized ear. This stretching movement helps open the Eustachian tube and is as effective for stubborn ears during descent as it is on the surface.

If your ears respond sluggishly during the pre-dive check, or particularly if there is nasal stuffiness, the use of a nasal decongestant is suggested. Several brands on the market are available

Below left: An ear squeeze, fluid in the middle ear, will cause the membrane to bulge out. As pressure increases, if air is not introduced through the Eustachian tube, the body will seek to equalize the negative pressure in the middle ear by leaking fluid from the surrounding blood vessels into the cavity. Below right: The large dark area in the lower right quadrant of this eardrum is a rupture, or tear, in the membrane.



with or without a prescription. However, divers should never use any medication not prescribed by their physician, preferably knowledgeable in diving medicine. Remember, if you use a spray or systemic decongestant tablet, always test your reaction when you will *not* be diving, to avoid adverse reactions occurring while under water. And if you use a nasal spray, do so 15 to 20 minutes before diving.

Now, about the descent. First, equalize on the surface just before entry or starting your descent. This gives you an advantage during the first few feet so you are free to adjust your gear, buoyancy and so forth. Descend feet-first for the first ten to 30 feet, preferably down an anchor or descent line. Descending head down causes an engorgement of the blood vessels of the mucous membranes of the oral-nasal cavity, causing them to swell and may close the Eustachian tubes even tighter. Using an anchor line gives you something to hold onto to control or stop your descent, in the case of difficulty.

Make a positive equalization effort every few feet during descent — as soon

as you feel the slightest pressure or fullness in the ears. *Never* wait until you are in discomfort or pain. Follow each Valsalva with a swallowing or movement of the jaw. This will balance the pressure in case of middle ear overinflation. Often a diver will forget this step and interpret the full sensation as a failure to equalize. Thus he Valsalvas again, increasing the sensation of fullness further and the cycle is repeated until the dive must be aborted due to an *overpressurized ear*. The secret to success is to descend at a slow, controlled rate, Valsalva when you feel the first fullness, yawn or swallow as you descend slowly and continue this rhythmic sequence all the way down.

Anytime you cannot relieve the full sensation or are in pain, *stop descent immediately*. Ascend a few feet, which should relieve the ear pressure, but remember not to Valsalva while ascending. It can lead to a pulmonary overpressure accident. If you continue to have difficulty equalizing and press on thinking it will improve as you go deeper — it won't. Pressing on despite pain may jeopardize that dive, diving for weeks or ever again.

Fluid in the Middle Ear

A diver can get into serious trouble if he continues descent without equalizing adequately. Fluid will be forced from the blood vessels in the lining of the middle ear into the cavity, when the body tries to equalize the negative pressure by reducing the air volume. The amount of fluid that collects in the middle ear depends on the pressure difference and how long it lasts. When the diver surfaces, he will experience reduced hearing, a full feeling and gurgling or bubbling in the ears, particularly when he forces air through the Eustachian tube into the middle ear. He may also experience a ringing sensation. The diver should be treated by an ear, nose and throat specialist who will probably prescribe decongestants, nasal sprays and no further diving.

Eardrum Rupture

If enough pressure difference is created across the eardrum, it will tear, thus equalizing the pressure. If this happens above water, such as in a recompression chamber, there will be severe pain, reduced hearing and possibly ringing in

continued

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EAR CLEARING *continued*

the ear or blood in the external ear canal. This traumatic rupture will heal in one or more weeks, but the diver must see a physician as soon as possible.

If the eardrum ruptures underwater, it could lead to a potentially fatal series of events. Water below body temperature will enter the middle ear and set up convective currents in the fluid of the inner ear structures, the organs which control equilibrium. The diver will experience vertigo: the loss of equilibrium with severe dizziness, sometimes with nausea and vomiting. It's like getting sick from a wild carnival ride with rapid rotary motion — only underwater. A diver may panic and drown or embolize in a panic-driven ascent.

Another rare, but possible, eardrum rupture can occur from a standing or giant stride entry from an elevated platform or boat. If the diver's head is cocked or strikes the water at an angle, the impact between the head and water can create an overpressure on the outside of the eardrum causing it to rupture without pain. The diver will become aware of the rupture when he cannot equalize without a bubbling sensation. The diver must ascend so water does not enter the middle ear and cause vertigo. Another dive vacation bites the dust.

Alternobaric Vertigo

A diver may also suffer sudden dizziness and disorientation on ascent or descent, without eardrum rupture. This sensation is apparently caused by an imbalance created when only one ear equalizes and the imbalance disrupts the delicate inner ear structures. This can be avoided by controlled ascents and descents, preferably on a line. The diver who experiences sudden vertigo should grab onto something to help him regain equilibrium. Ears should be cleared when the diver has the first hint of fullness and the differential in pressure is not so great. Alternobaric vertigo usually passes quickly and if the diver gains control and doesn't panic, it will be relieved. However, the diver should ascend carefully and abort the dive.

Reverse Squeeze

Sometimes a diver may have a middle ear squeeze during ascent and experience the same fullness, reduced hearing, pain and ear-ringing. The Valsalva maneuver will not help in this case; it only makes it worse. Descend a few feet to relieve the sensation and continue as-

cent slowly. The diver must eventually reach the surface, so a reverse squeeze must be tolerated until he can reach medical care from an ear, nose and throat specialist. It is also possible for the eardrum to rupture on ascent, although the pressure should follow the path of least resistance and be relieved through the Eustachian tube before tearing the eardrum. This usually happens when a diver dives with a stuffy head, cold or respiratory infection.

Round Window Rupture

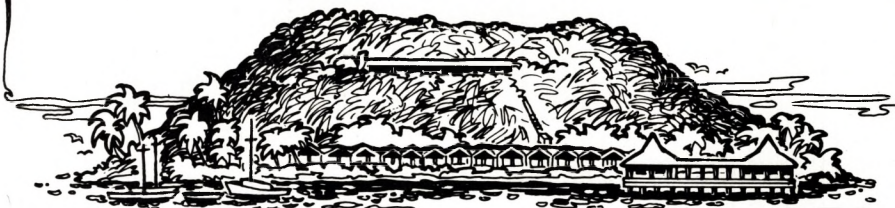
The final ear problem the diver has to worry about is rupture of the round window, the membrane separating the air-filled middle ear cavity from the fluid-filled inner ear. As a diver descends without adequately equalizing the pressure in his ears he may, with more force and vigor, Valsalva with no success. This will not only elevate the pressure in the oral-nasal cavity but also in the chest, which in turn affects the cerebrospinal fluid. The increased pressure in the fluid surrounding the brain and spinal cord is reflected in the fluid in the inner ear. With a blocked Eustachian tube, the middle ear has a reduced pressure and a larger differential is created across the round window than that across the eardrum. With sufficient pressure therefore, it can rupture with the fluid of the inner ear leaking into the middle ear. This will result in hearing loss, ear-ringing and vertigo, which will persist after recovery to shore or boat. Again, get the diver to an ear, nose and throat doctor immediately.

Decompression sickness involving the inner ear also can produce symptoms of vertigo and hearing loss. Therefore the dive history of a diver is important to the medical specialist who treats him. Inner ear decompression sickness requires prompt recompression therapy in a chamber, but round window rupture may be aggravated by recompression. Only a diving doctor is qualified to handle these problems.

Prevention: The Key

Ear problems can happen to the novice or expert diver. Knowing when to dive and when to abort a dive should prevent the more serious ear injuries. They usually happen when the diver forces himself deeper in spite of equalization problems. In short, when your ears tell you no go, listen to them. They are the only two you will ever have. ☺

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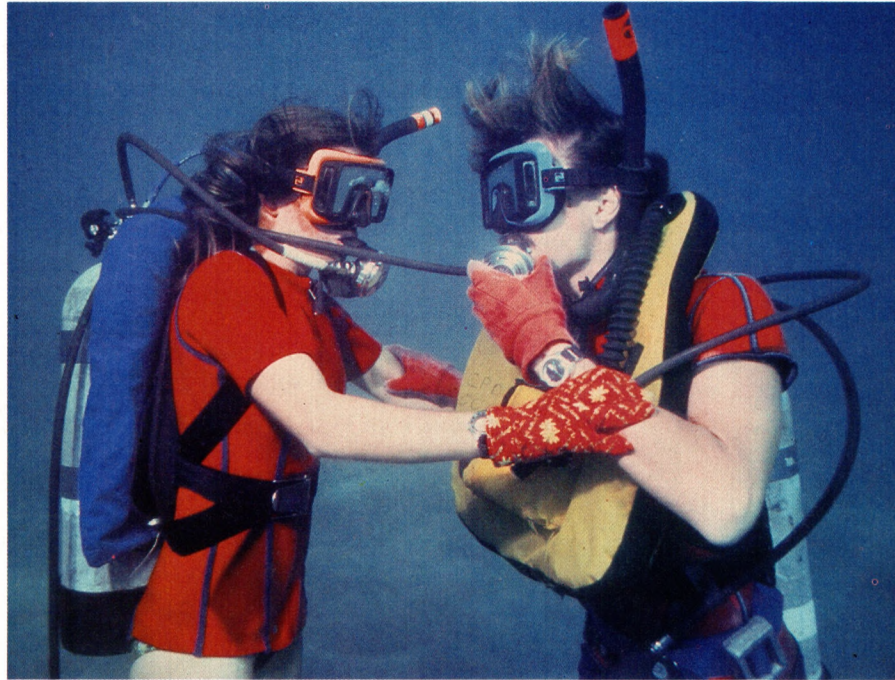
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Advanced Instruction:

Buddy Breathing: Still Useful After All These Years?

*There is some evidence that buddy breathing
could be you and your buddy's worst enemy.*



BY JON HARDY
PHOTOGRAPHY BY
TED BOEHLER

Two divers swim calmly and easily to the surface on the outside edge of a heavy kelp bed off the beach near Santa Barbara. It has been a beautiful but cold and tiring dive. Tom, the younger diver, is a teenager who recently finished his advanced diving course. Jim, the older diver has extensive diving experience and was Tom's instructor for the advanced course. While the two of them are relaxing on the surface talking over all that they saw during the dive, Tom discovers that not only is he extremely low on air, but his snorkel is missing. To make matters worse, Jim is diving with a regulator that has no octopus, as his

*Jon Hardy is former executive director of the National Association of Underwater Instructors, now a private consultant and expert witness in diving-accident lawsuits. He is author of **The Business of Sport Diving** and the Jeppesen **Advanced Activities Sport Diver Manual**.*

usual regulator is at the store being overhauled for the coming season.

Faced with a very long surface swim to go around the kelp bed, or an arduous crawl over the heavy kelp with no air or snorkel, Tom and Jim decide to buddy breathe horizontally under the kelp bed into the beach. They settle to the bottom and after some fumbling, establish a buddy breathing pattern, then make the swim under the kelp to the beach.

The scene changes to the Caribbean and Colleen, an underwater instructor, is completing the open water training for her class. This day's skills include emergency procedures and ascents. The final skill to be performed is the buddy breathing ascent. Colleen goes to the bottom with Henry who has been a slow and apprehensive student throughout the course. After establishing the buddy breathing pattern on the bottom, they swim together toward the surface while continuing to buddy breathe.

Only a few feet from the bottom, Henry refuses to return the regulator to Colleen. Rather than push Henry into a real diving emergency, Colleen depresses her mechanical inflator and while holding him, makes an emergency swimming ascent, exhaling all the way to the surface with Henry still breathing from her regulator.

After they are safely at the surface, Henry gets a very clear, "What the hell are you doing?" from Colleen.

Again, the scene changes to a boat dive in the Pacific. Two very experienced divers are returning from a deep dive. Both their calculation of the decompression tables and their decom meters put them on the knife's edge of needing decompression. Carol and John are both in their 30s and not as fit as they once were, so they have agreed to take no chances with decompression. Therefore, they stop together at ten feet to take a precautionary decompression stop.

Almost the instant they arrive at ten feet, John's air supply runs out. With an ease developed by years of diving together, Carol passes her regulator to John and they start buddy breathing. The buddy breathing continues in an easy relaxed manner for five minutes before they surface.

Fred and his dad, Carl, completed their basic diver training only two months ago and now they are making a deep dive off the North Atlantic Coast. While on the bottom, Carl runs out of air and goes immediately to his son. With some difficulty, they establish buddy breathing and start their ascent.

During the ascent, control becomes more and more difficult, then in mid-water with their BC's already fully inflated, Carl's weight belt accidentally re-

Below: When buddy breathing, each diver should have a hand on the regulator, but the donor maintains control. Preceding page: Octopus breathing is a safer, less stressful alternative.



leases and falls away. All control is lost and Carl rushes toward the surface with no air or regulator. By the time Fred arrives at the surface, his dad has already died of an air embolism.

All of these both successful and unsuccessful stories of buddy breathing are true. How valuable is a diving emergency procedure that appears to fail as often as it works? Let's take a close look at this skill called *buddy breathing*.

Survey and Report Results

In detailed summary reports done by both the University of Rhode Island and the National Association of Underwater Instructors, there is substantial evidence that buddy breathing is a dangerous ascent procedure. These reports are based primarily on fatal diving accidents. But what about all the successful ascents made using buddy breathing?

There are no official records of these; so with a keen interest in the

subject of emergency ascent procedures, I have been conducting an informal survey for several years. Instructors and divers throughout North America have been asked about successful ascents done under emergency conditions. This survey has revealed that most successful emergency ascents are done independently by swimming or using buoyancy to gain the surface, yet many successful buddy breathing rescues have still been performed by divers. An interesting fact has come from the successful buddy breathing events: In nearly all cases of successful buddy breathing, one or both of the divers were instructors or experienced working divers. Rarely in this informal survey have there been cases of successful buddy breathing by the general diving public.

The Difficulty

What makes buddy breathing such an unusually difficult skill? When we stop

continued

and think about it, buddy breathing is probably *the* most difficult skill used by sport divers. The only other skill that even approaches it in complexity is in-water mouth-to-mouth resuscitation. In the case of mouth-to-mouth, there are no alternatives, and fortunately the requirement to use this skill is rare.

Buddy breathing does not allow for the large margin of error that is acceptable in most diving skills, such as fin kicks, surface dives, entries, independent ascents and so on. These can be done with considerable error and cause no serious consequences.

Part of the difficulty obviously involves two people not only moving through the water and ascending, but also attempting to control buoyancy, pass a regulator back and forth, while also keeping their masks from flooding. In fact, buddy breathing is a three- or four-handed skill for each diver. One hand to hold the buddy, one hand to hold the regulator, one hand to control buoyancy and one hand to clear the mask if it is flooded.

Buddy breathing is a complicated skill that is performed under emergency or stressful conditions. It is also difficult to remember, and is only rarely practiced by sport divers. Skills such as ascending, buoyancy control, mask and regulator clearing are more often used. An additional complication is that many sport divers do not correctly use many skills that are part of buddy breathing. These skills include buoyancy control, ascent, mask and regulator clearing, plus buddy contact. On top of all this, during the buddy breathing procedure, with two divers of approximately equal ability, it is likely that the diver providing the air may also run out of air.

An underlying factor making buddy breathing difficult appears to be a lack of enough training during diving courses. Educational research indicates that to be learned a skill must be repeated *successfully* over 18 times. In very few diving courses would it be possible to repeat as complex a skill as buddy breathing successfully on 18 occasions.

As we learn more about the psychology of diving, in the out of air situation or during buoyancy control, we discover that one of the most significant fears of sport divers is the interruption of their air supply by removing the regulator to either control buoyancy or share air. This is certainly an understandable psychological reaction.

On top of all the mechanical and training difficulties there are other psychological problems imposed by the stressful emergency situation when a diver is out of air and chooses to buddy breathe. When divers are under stress, there are several physical and mental reactions that detract from their ability to successfully buddy breathe. These reactions include muscle tension, uncoordinated movement, hyperventilation, fixation of ideas, unexpected behavior, inappropriate responses and the sudden loss of learned skills.

The Alternatives

But what about the alternatives? Are they any better or is buddy breathing something we must retain and learn to use more effectively?

Buddy breathing is usually needed because of an out of air or low on air situation. Accident studies have revealed that nearly all "out of air" situations are really "low on air" situations. After the so called out of air diving accident has occurred, the victim's tank usually has from 100 to 600 psi remaining, even though the accident reports state the victim was out of air.

In reality, the problem is a low air situation that can be prevented or dealt with by other less difficult methods, such as:

1. A slow, easy normal ascent.
2. An emergency swimming ascent done as nearly like a normal ascent as possible, but going faster.
3. A positively buoyant ascent done by inflating the BC or ditching the weight belt to increase the speed of the emergency swimming ascent.
4. Octopus or alternate breathing equipment ascent; if the buddy is closer than the surface and is equipped.

If each of these alternatives is compared to buddy breathing, all of them are less complex, less stressful, less exacting, less difficult, and require less skill or practice, while only the use of a buddy's alternate breathing equipment needs to risk another person's safety.

Possible Uses

By expanding the concept of buddy breathing to one of shared air between buddies, the concept includes the use of an octopus regulator or another alternate breathing source. This then becomes a safer and more viable alternative, provided the buddy is closer than the surface, the buddy has the necessary

equipment, and has some air available.

If your buddy does *not* have alternate breathing equipment, *and* the distance to the surface is very great; *or* there is an obstruction to the surface, such as a cave, wreck, heavy kelp or ice; *or* some equipment difficulty or the high level of stress make an ascent to the surface impossible; in these cases, buddy breathing is a needed skill.

Buddy breathing has its most valuable use as a stationary or horizontal traveling skill. It can be used on the bottom for the out of air diver to become calm and gain control with buddy support, while increasing buoyancy for an easier ascent to the surface. Once the situation is under control, the out of air diver returns to his own regulator and makes a swimming or buoyant ascent to the surface with the buddy nearby.

Another stationary use of buddy breathing is during decompression stops. The octopus regulator makes this much easier, yet buddy breathing is probably at its safest during such a procedure. When buddy breathing is used for horizontal swimming to come out from under some overhead obstruction, it can often be terminated as soon as there is a clear path to the surface. The diver then returns to using his own regulator for the ascent to the surface.

As there are still these possible situations where buddy breathing may be needed, it is important to continue teaching it. Buddy breathing is still valuable primarily as a stationary or horizontal skill. Buddy breathing should be taught in its proper role so it is not chosen as an alternative when some other choice would be safer and easier.

The How To of Prevention

Prevention starts with avoiding the out of air or low on air situation. Breathing should be in a slow, deep and relaxed manner with no breath-holding or rapid breathing. Regulator performance is greatly improved by regular professional maintenance, avoiding depths over 100 feet, avoiding tank pressures of less than 500 psi and breathing slowly.

Buddies should also stay close together for both physical and psychological support. They should know each other's equipment, know the procedures necessary to help each other and know standard hand signals.

Buoyancy control is extremely valuable as it makes diving easier, prevents problems and helps prepare the diver for

difficulties. Divers who stay as near neutral as possible are ready for an easy ascent, for ascending only a short distance gives positive buoyancy to aid in further ascending. Continued training in advanced or specialty courses also helps divers become more skillful and therefore, prevent difficulties. Dive planning is another way to avoid emergencies. Good diver fitness, both physical and mental, prepares divers to meet the stresses of diving.

Equipment can greatly lessen the possibilities of an out of air situation. All divers should use at least a submersible pressure gauge and many divers choose to back up the gauge with a reserve warning mechanism, either a J-valve or an audio alarm. All divers should use mechanical low pressure inflators to increase the ease of diving and help them practice good buoyancy control. Whenever diving in any unique or particularly demanding situation, divers should have a source of alternate air. These situations include cave diving, ice diving, wreck diving, deep and decompression diving, plus instruction.

Setting reasonable limits and allowing a margin of safety in both depth and time underwater helps to prevent the situations that lead to emergencies. In addition, when low on air a diver can stop, breathe easy, check the situation, get control and then calmly swim to the surface with the help of buoyancy while breathing the remaining air in the tank.

Techniques of Buddy Breathing

Before buddy breathing, divers need to stop, breathe easy, and get control, then proceed to their buddy and signal the need to buddy breathe. Now a rhythm is established on the bottom while adjusting buoyancy so the divers are at least neutrally buoyant. The divers maintain contact by holding onto each other while keeping in eye contact. The donor should be on the right when moving horizontally or the divers can face each other when ascending. The donor maintains control of the regulator mouthpiece, but each diver has a hand on the regulator so each can guide the mouthpiece into their mouth and clear it by blowing. Normally, two breaths are taken by each diver before returning the mouthpiece. The purge button should be kept as clear as possible so either diver may use it as needed. It is possible to use a regulator and not put it all the way into the mouth. It can still be blown

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BUDDY BREATHING *continued*

clear with it placed only on the lips. Physical contact is not only for the mechanical purposes of doing the skill, but increases the security of the diver who does not have air. The procedure is done in a slow, relaxed manner.

During the buddy breathing ascent, buoyancy control should be used so the divers do not have to work too hard. When not using the regulator, each diver should be sure to exhale. Both divers also keep glancing at the surface to be sure it is clear. The divers need to be aware that the donor's air may become exhausted during the buddy breathing. A buddy-breathing ascent can be aborted at any time and changed to a swimming or buoyant ascent.

Buddy breathing has been taught for many years with divers blowing bubbles whenever the regulator is not in their mouths. This is both appropriate and important when ascending by buddy breathing, but as described here, most buddy breathing should be done in a stationary position or while swimming horizontally, therefore, blowing bubbles between regulator exchanges is inappropriate, unnecessary and causes difficulties. Divers need only exhale during buddy breathing ascents. If they are buddy breathing in a horizontal or stationary manner, they should keep their breath to clear the regulator when it is returned.

This change of procedure will no doubt distress many instructors and divers who learned the old way. But as the reasons for using certain techniques change, the procedures for doing these techniques need to also change. The diving community should keep an open mind to new thinking and new methods. In this case, it is more important for the diver to be relaxed and able to easily clear the regulator than it is to blow bubbles that have no meaning unless ascending.

The Joy of Diving

Sport diving is done for enjoyment and to enjoy diving, sport divers need to be safe and comfortable. Buddy breathing appears, for the majority of sport divers, to be neither safe nor enjoyable. So let's put it in its place, as an old, hazardous and specialized technique of limited use and instead, emphasize the use of newer techniques and particularly the newer equipment that makes diving easier, more comfortable, safer and above all, more enjoyable.



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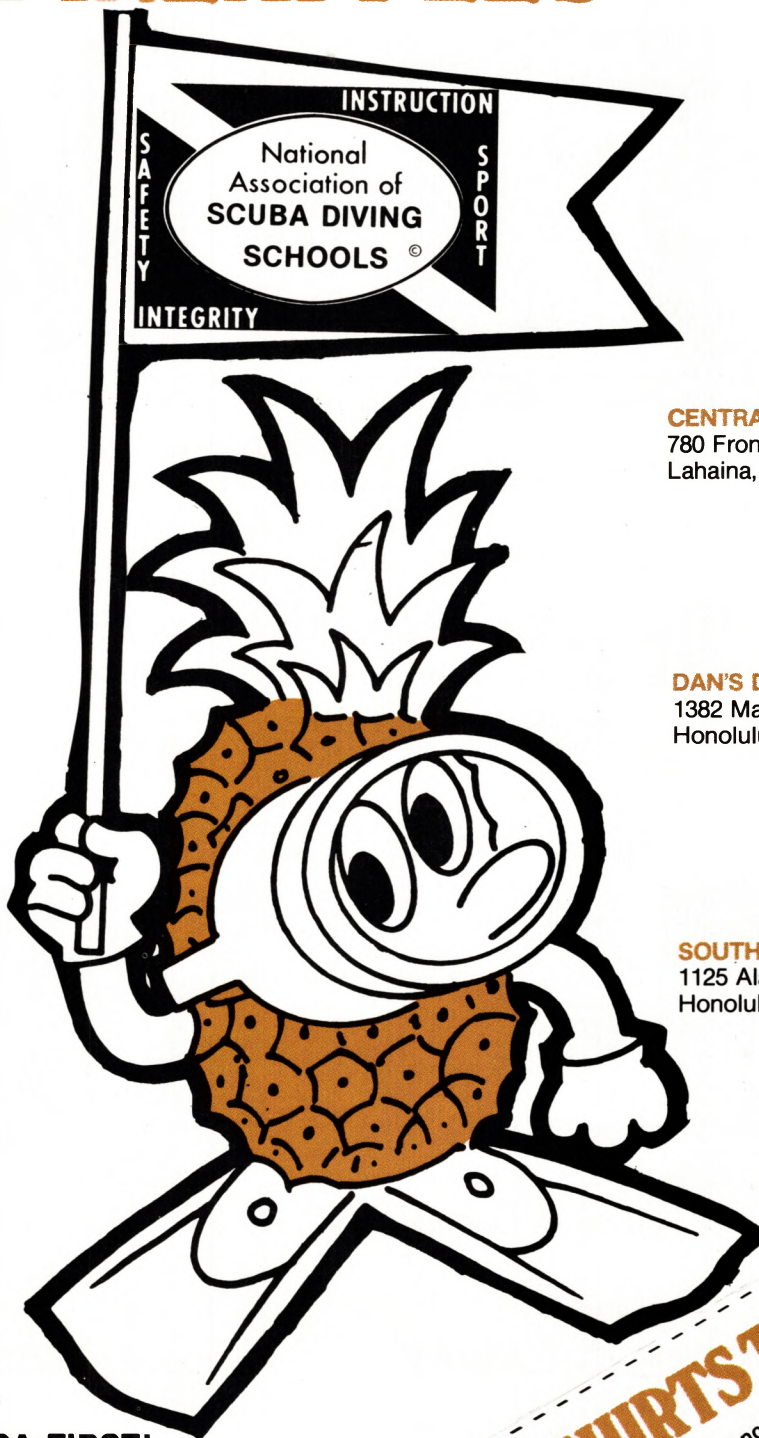
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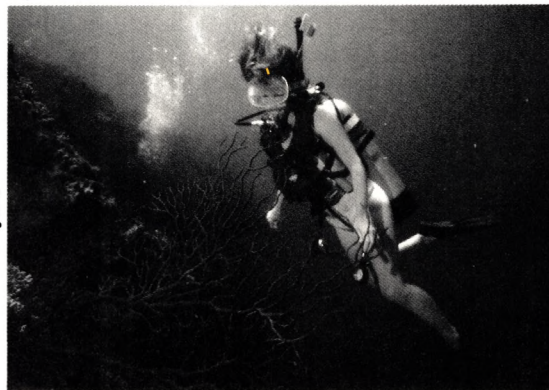
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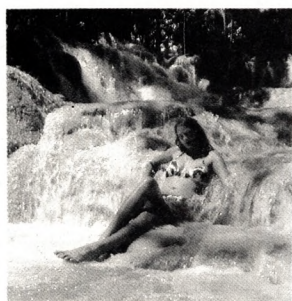
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The second annual *Sport Diver* Magazine photo competition has uncovered another crop of talented amateurs. We think their work, as evidenced by the entries, is of a very high caliber.

The grand prize winner, Bonnie Charles of Grand Cayman, British West Indies, has collected herself a hatful of accolades, a new Nikonos III underwater

camera and an invitation to submit further work to *Sport Diver* for possible publication. Bonnie's photograph was judged superior to entries from all over the U.S., Europe, Canada, Australia and the Caribbean.

Our other winners will receive a handsome wall plaque denoting their achievement.

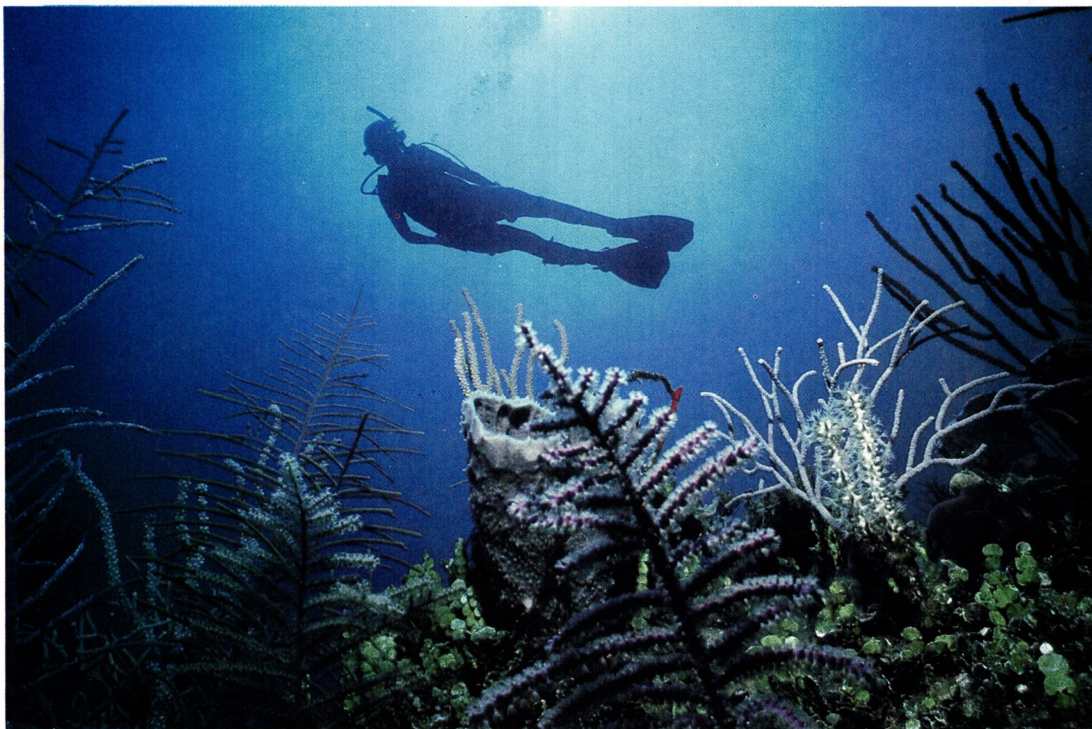
Entries are now being accepted for the third annual *Sport Diver* photographic competition. See the instructions on page 140.

Many excellent photographs were submitted to this competition; the photographers whose work is depicted here are to be congratulated for their insight and skill.

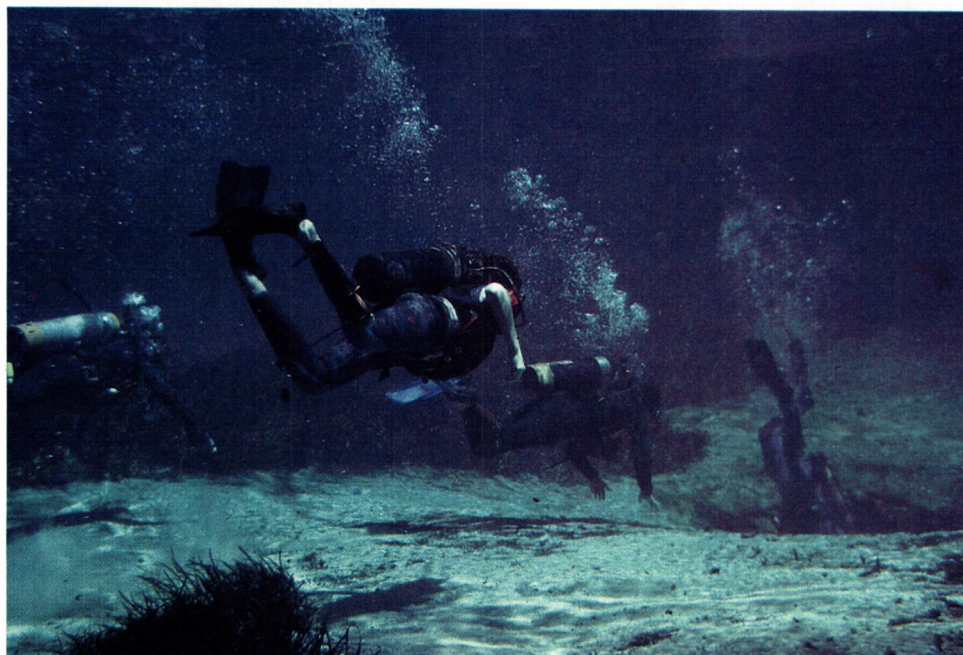
continued



Second Place, Saltwater Color
Norman Quinn, Toowong, Queensland, Australia
Nikonos II



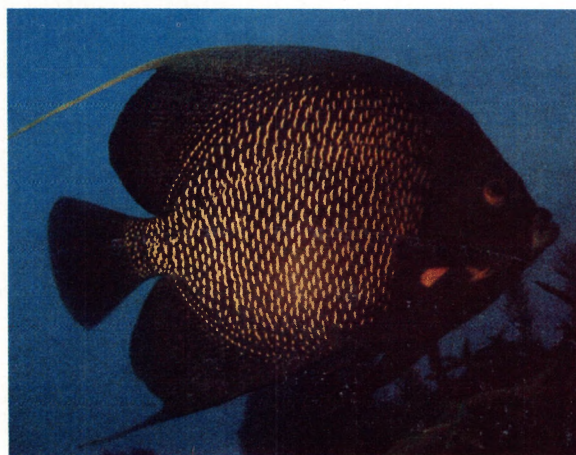
Third Place, Saltwater Color
John Snell, Waldorf, Maryland
Nikonos II



First Place, Freshwater Color
 Chip Clemmons, Ft. Walton, Florida
 Nikonos II



Second Place, Freshwater Color
 Marvin Smith, Ft. Pierce, Florida
 Nikonos II



First Place, Fixed Focus Color
 Arthur Cyr, Austin, Texas
 Pocket 40 Instamatic, Ikelite Housing



WILLIAM HUNZICKER

SPORT DIVER'S



NORMAN QUINN

1980 PHOTOGRAPHIC COMPETITION

ENTRY DEADLINE AUGUST 16, 1980

Enter now! The third annual *Sport Diver* photographic competition is in progress now. Take this opportunity to display your talent in the art of underwater photography. Finalists will be featured in *Sport Diver's* January/February issue of 1981. Contestants may enter one or more categories.

COMPETITION RULES:

Contest is open to all amateur photographers. All entries must be sent pre-paid with pre-addressed return envelope and sufficient return postage.

Print size shall be a minimum of 3 1/2 x 4 1/2 inches, maximum of 8 x 10 inches, glossy finish and mounted on a backing board. Entrants, name and address must appear on the back of each board.

Slides must be mounted in 2x2 inch mounts and inserted in plastic storage protectors with the entrant's name and address on each slide.

Movies must be 8mm, super 8 or 16mm with or without sound, 15 minutes or less. Entrant's name and address must appear on the container and the film leader.

All possible care will be exercised, but no responsibility will be assumed by *Sport Diver* Magazine or Ziff-Davis Publishing Company for the loss or damage of entries.

Judging shall be done by the photo competition committee using a basic point system on technique, composition, color, quality and story. Decision of committee is final.

Submission of entry acknowledges right of *Sport Diver* Magazine to publish photographs entered for any purpose.

1. Saltwater color
2. Saltwater b&w
3. Freshwater color
4. Freshwater b&w
5. Fixed-focus photography, color
6. Fixed-focus b&w
7. Creative photography (special processing, infrared, solarization, etc.)
8. Movies

Name _____

Address _____ City _____

State _____ Country _____ Zip _____

Profession _____

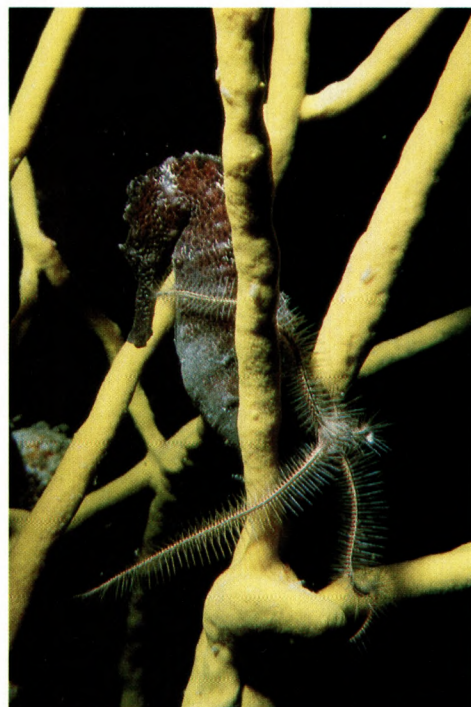
Type of u/w camera/housing/lighting used _____

Please indicate number of entries enclosed for each category:

Category 1 _____ 2 _____ 3 _____ 4 _____ 5 _____ 6 _____ 7 _____ 8 _____

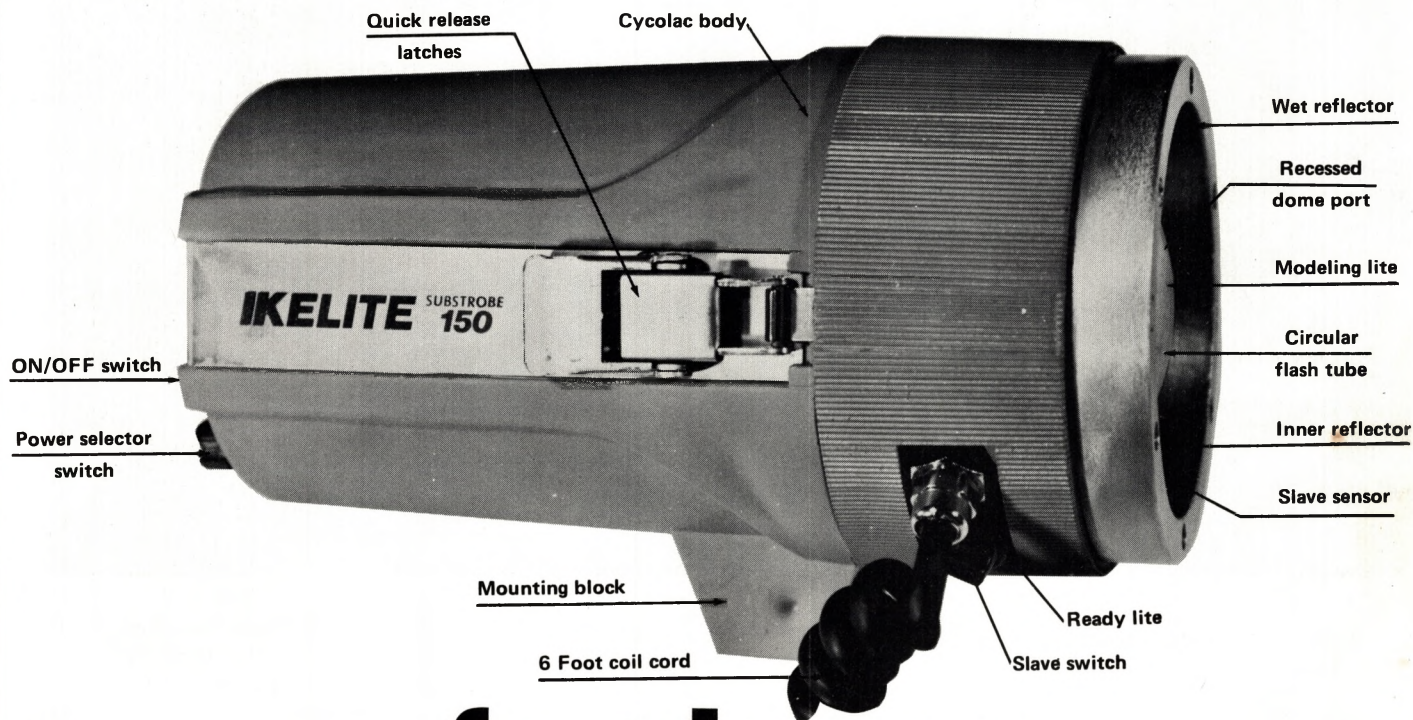
Send to:

Sport Diver Underwater Photo Competition
444 Brickell Avenue, Suite 250, Miami, Florida 33131



JOHN SMELL

VERY FLASHY



features

SUBSTROBE 150

ENERGY RATING

Adjustable power output of 40 watt-sec., 75 watt-sec., 150 watt-sec.

POWER SOURCE

Interchangeable NI-CAD battery pack; standard recharge 15 hrs. Optional Quick Charger recharges in 3 hrs.

NUMBER OF FLASHES

@ 40 watt-sec.	approx. 600
@ 75 watt-sec.	approx. 300
@ 150 watt-sec.	approx. 150

RECYCLE TIMES

@ 40 watt-sec.	1.5 sec.
@ 75 watt-sec.	3.0 sec.
@ 150 watt-sec.	5.0 sec.

ANGLE OF COVERAGE

90 degrees

MODELING LITE

15 degree beam angle, 60,000 candle-power

MOUNTING BLOCK

Universally adaptable

CONNECTORS

Ikelite ICS or optional E/O

**ikelite**

UNDERWATER SYSTEMS

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Indianapolis, Indiana 46208

SUBSTROBE 75

ENERGY RATING

Adjustable power output of 40 watt-sec., 75 watt-sec.

POWER SOURCE

Non-removable NI-CAD battery pack; standard recharge 4 hrs.

NUMBER OF FLASHES / RECYCLE TIME

@ 40 watt-sec.	approx. 300/1.5 sec.
@ 75 watt-sec.	approx. 150/3.0 sec.

Other features of the Substrobe 75 are the same as the Substrobe 150.

CONTACT
YOUR LOCAL IKELITE DEALER
OR SEND \$1 FOR CATALOG



Crystal River, Florida

*The famous manatees may be in trouble,
but divers keep pouring in to swim
with the playful beasts.*

BY STEVE BLOUNT
PHOTOGRAPHY BY
FRED BAVENDAM

The Cousteaus came here to film them; so did Jack McKenney and a number of TV crews. Crystal River's manatees have attracted the attention of divers and environmentalists all over the world to this tiny community on the west coast of Florida.

Before there were divers, before the manatees were considered good press, Crystal River was a resort town, one of those Florida retreats that catered to bass fishermen and boaters escaping non-aquatic winter weather "up North." The town's existence was settled, routine, harmonious. Each October the boaters and fishermen began to drift in, filling the vacation homes along the river and every hotel room from Ocala to Weeki Wachee. Seasonal businesses unshuttered, restaurants filled to capacity and the season was on. Simple. The manatees were not a burning community issue; they were simply a funny-looking lump in the water near your favorite bass hole.

The Marine Mammal Protection Act

*Steve Blount is the editor of **Sport Diver**.*

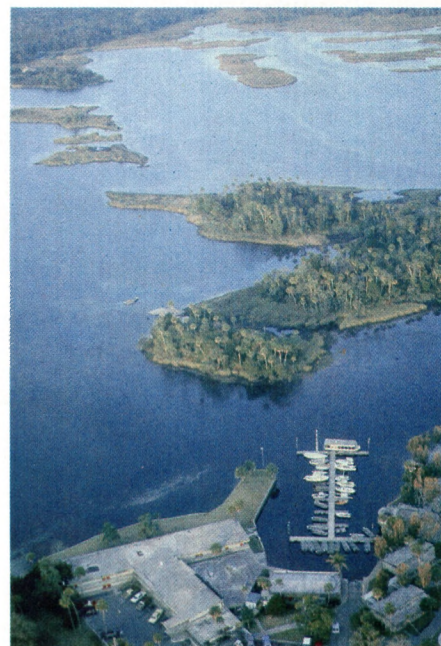


of 1972 and the Endangered Species Act of 1973 helped to change that. The West Indian manatee, *Trichechus manatus*, was found to be in danger of extinction. The only sizeable population of manatees in the U.S. — now estimated at 800 to 1000 — inhabits the inland and coastal waters of Florida. The manatees are air-breathing, herbivorous warm-blooded mammals, and their systems can tolerate only a very narrow range of water temperatures. When the ocean cools down during the winter, the manatees migrate

into Florida's fresh water springs and spring-fed rivers. There they collide — literally — with fishermen, boaters, swimmers and divers drawn by the springs's 70-degree waters. The largest concentration of manatees, 87 at one point last year, congregate in the Crystal River, around its main spring, at secondary springs such as Three Sisters or near the thermal outfall pipes of the Crystal River nuclear generating plant.

The leading cause of death among manatees is wounds from boat propel-

Facing page: A large herd of West Indian manatees, *Trichechus manatus*, winters in Florida's Crystal River. Left: Holes in the limestone walls of the main spring are a haven for minnows and small bream. Below: Looking west, the main spring is just to the left of Banana Island, in the center of the photo. The docks of Port Paradise Marina, at the bottom, are only a few yards from the spring.



lers, inflicted by commercial and private craft when the slow-moving animals surface to breathe. The next leading cause is stress from exposure to cold water in manatees which have been crowded out of the warm spring areas by people.

The state and federal governments have stepped in to help the manatees, to give them breathing space. The actions they took ended the simplicity and harmony of Crystal River's lifestyle. Almost everyone agrees the manatees should be protected, but there is wide disagreement over the methods being employed by state and federal authorities.

In the past, a state program has sought to protect the manatees by restricting boats to maintain only enough speed to steer in posted manatee areas and by making it unlawful " ... intentionally, or negligently, to annoy, molest, harass, or disturb any manatee."

Naturally, the people who maintain \$100,000-plus vacation homes on the river for the express purpose of having a place to run their power boats during the winter object to the speed limits — which

continued

are posted everywhere in Crystal River. Some abide by the speed limits, some don't. Manatees are still being killed and injured by boat propellers.

Some divers have objected to the regulations against harassing manatees since "... diving down to touch or pursue ..." and other unspecified activities can constitute harassment. Most divers abide by the rules, but manatees are still being scared away from warm spring sites by groups of divers, boaters and swimmers.

In late 1979 the U.S. Department of Interior issued a rulemaking allowing the Director of the U.S. Fish and Wildlife Service to establish manatee protection areas. The rulemaking is not a new law, it simply established a procedure by which the director could exercise authority granted Interior by the Marine Mammal Act. These protection areas come in two varieties: sanctuaries and refuges. In a sanctuary, it is illegal to engage in any waterborne activity including boating and diving. In a refuge, it is illegal to engage in any activity specifically prohibited within that refuge. In a given refuge, diving might be permitted while boating is prohibited; in another, boating might be permitted while diving and swimming are prohibited.

So far, no sanctuaries or refuges have been established by the Fish and Wildlife Service. "At this point we feel there's room for both diving and manatees in Crystal River," said John Oberheu, a regional Fish and Wildlife Service official.

Oberheu said the Service doesn't want to enforce unnecessary regulations governing any water activity. The senior law enforcement agent for the U.S. Fish and Wildlife Service in North Florida, Robert Prather, said that "If divers are looking at [manatees], we won't say a thing. If they're chasing them, we'll stop them. If they're grabbing manatees, we'll arrest them."

The controversy over manatee protection and the attendant publicity have increased the pressure on the herd. Crystal River has become a favorite winter excursion for divers all over the eastern U.S., and it is more popular than ever as a check-out site for Florida instructors. While these divers have been made sympathetic to the plight of the manatees through diving with the mammals, and their support has undoubtedly helped make the manatee a cause célèbre, the increasing numbers of visitors threatens to force the shy animals away from their





Left: This baby followed the photographer at close range despite its mother's objections. Top: Divers enter the main spring from a rented boat. The sign in the background warns boaters to slow down in manatee areas. Early morning seems to be the best time to swim with manatees. Above: Many manatees show no fear of divers.

favorite wintering spots into cold water.

"There's a build up of divers almost to the point that there is such pressure on the animals they may be forced to leave Crystal River spring altogether," John Oberheu said.

The message is clear. If we can't respect the needs of the manatees and act responsibly toward them, we won't be allowed to dive with them in certain places at certain times of the year.

Dive operators in Crystal River, while profiting from increasing business, have generally been responsive to the problems of the manatees. Posters describing prohibited activities are up in all of the stores, and most pass out pamphlets provided by the state.

One of the most strident protectionists, Charles Talley, flies the river every day in a small airplane to locate manatees for divers. He's not sure the new regulations will solve anything.

"See that place over there," Talley pointed to a house near the main spring, a two-story contemporary with a boat-house and electric boat davits. "Do you think the guy who lives there is going to tie up his boat and not go out because the government wants to protect manatees?"

Talley said he is afraid the homeowners and boaters might go so far as to solve the manatee problem permanently, by quietly getting rid of them.

If they do, they'll have to risk state penalties of up to one year in jail and a \$20,000 fine and perhaps federal charges on top of that.

As we neared the spot where we'd seen manatees from the air, a power boat appeared, heading right for the herd. Talley jumped up and yelled, "There's manatees ahead! Steer around!"

The boat owner ignored him.

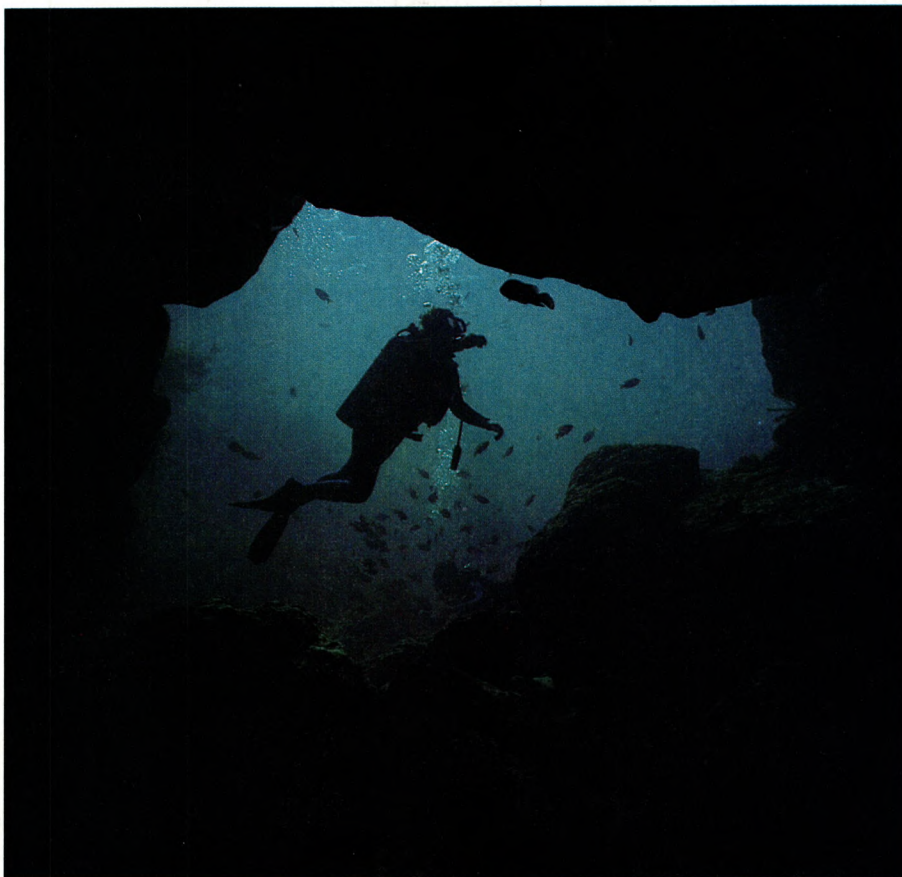
Talley waved his paddle and repeated the warning. The boat owner, with his 45-foot craft now directly over the manatees, replied "I've got an out-board drive, it can't hurt manatees."

"You idiot!" Talley shouted.

No existing type of prop or drive system can prevent wounds to manatees. Any moving boat in the vicinity of a manatee is a potential killer.

We could still see manatee snouts breaking the surface at intervals, so we paddled over. The best way to approach the animals initially is by snorkeling in among them and waiting for them to make contact with you. Some people say humming into your snorkel helps.

continued



*Above: The cavern at the main spring can easily be penetrated within sight of the outside light. Right: Bluegills, *Lepomis macrochirus*, are voracious feeders and will take just about anything offered them.*

Whatever trick you use, the experience of being nuzzled by a friendly, 2000-pound aquatic mammal is simply unforgettable.

"The young ones seemed friendliest towards me," said photographer Fred Bavendam. "It could be because they are more curious. One little fellow came in very close while I was filming, actually put his nose up against the dome of my housing and wouldn't back off so I could get him in focus. The mother became disturbed and tried to get between me and the calf. As I backed up to give way to her, the calf just followed me, staying as close as possible."

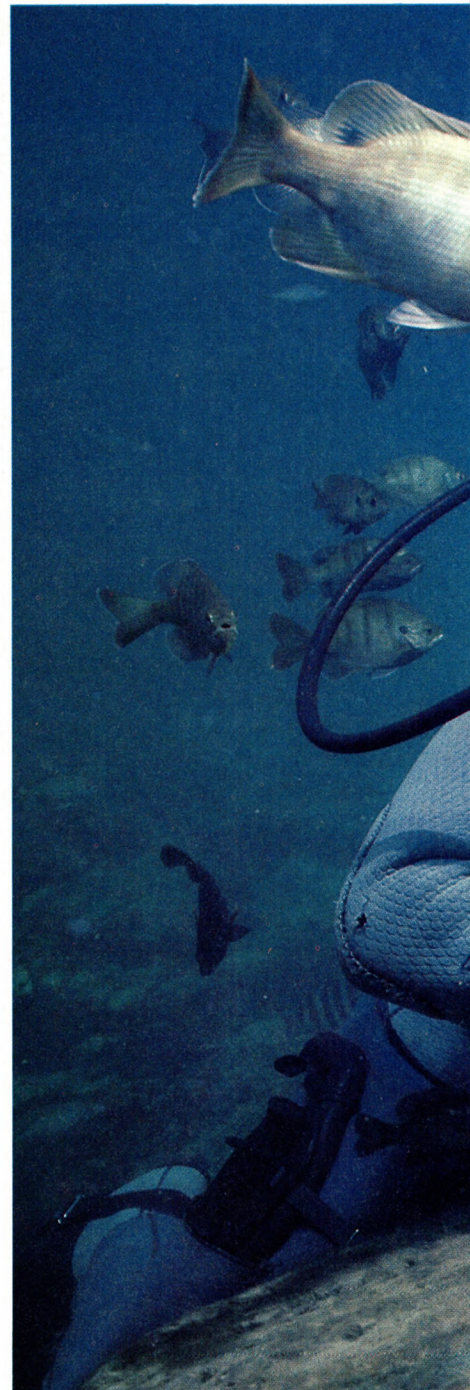
Other manatees are less sociable and keep their distance from divers. But the ones who like attention seem to just feed on it, like a spoiled puppy. They particularly like to be handfed seaweed and have their stomachs scratched.

Leaving the manatees in the river, we moved on to the main spring to check out their usual winter digs.

The spring, just west of Banana Is-

land in King's Bay, is the main source of the Crystal River. The sink is about 75 feet across. Around its edges the water is chest deep. The normal way to dive the river is to rent a 14- to 16-foot boat from a dive operator, throw in your gear and anchor in the shallows. The walls of the sink are precipitous, dropping quickly to 30 feet; huge limestone boulders jut out at odd angles. Rays of pure sunlight cleave the green aqueous curtain, sparkling off the silver bodies of bream and mullet. These fish are voracious eaters and are quite used to divers. Save some breakfast scraps for them — you'll have a school eating out of your hand in minutes.

At the bottom of the sink is a cavern which can be penetrated within sight of the ambient sunlight. The entrance resembles a boulder field at the foot of an unstable mountain; huge rocks overlapping, a crazy-quilt staircase ascending towards the surface. Silvery airbells collect on the roof of the cavern, hissing through the porous limestone, producing tiny aquarium-pump bubble streams



outside from the top of the cavern roof.

Having your own boat imparts a great feeling of mobility. Each morning we loaded in several sets of tanks, lunch and a cooler and made a day of it. After the main spring, we dove Three Sisters, a triad of springs downriver. One of the three is somewhat difficult to get into with a boat. The other two are twin heads only 50 yards apart, with a shallow run connecting them with the river. They are archetypal Florida springs: limestone banks; clear, cool water; shaded by over-



hanging trees. Both springs are thickly carpeted with fine silt and leaves; it doesn't take much to stir them up. They are about 20 feet deep and are home port for a thousand or so bream.

After acquiring an all-day sunburn (yes, even in the winter) we hit several of the nightspots. Crystal River and neighboring Homosassa Springs are still basically resort towns and there is a disproportionately large number of good restaurants in the area. Seafood is trucked in fresh daily from the Gulf coast, and

you can have anything from Lobster Newburg to an all-you-can-eat catfish dinner. The Yardarm in Old Homosassa is one of the noted seafood spots. The second floor dining room overlooks the Homosassa River and a small island inhabited by various breeds of monkeys. Unless the weather is raw, they'll be outside clowning for the troops until well after dark. Real Southern barbeque, one of my hereditary weaknesses, is the main course at Sonny's Fat Boy Restaurant on the highway in Crystal River.

Hotel rates are very reasonable year round, but you'll need reservations between October and April. Due to Crystal River's proximity to Orlando, some divers have made it an habitual pitstop on the way to Disney World. Interstate 75 and Ocala are about 40 miles away, putting it within two and a half hours of the Magic Kingdom.

Being that close, we hope some of the Midas Touch associated with the Magic Mouse and his playmates will rub off on Crystal River's manatees. ☺

SPORT DIVER DESTINATION DATA

CRYSTAL RIVER

GENERAL

Location: 85 miles north of Tampa and 80 miles northwest of Orlando
 Size: 2.5 square miles
 Topography: flat, coastal area
 Climate: subtropical with 50 inches of precipitation annually
 Population: 3000
 Language: English
 Monetary unit: U.S. dollar
 Diving season: year-round
 Tourist season: year-round

DIVING

Water temperature: 72°F year-round
 Visibility: 30-40 feet, rainy season
 June-August
 Depth of dives: 10-50 feet
 Tidal fall: 3 feet
 Types of diving: night, cave, springs
 Skill level: novice, intermediate, advanced
 Dives per day: 4
 Diving craft: good
 Sights:
 Fish: jacks, sheepshead, bream, mullet, catfish
 Invertebrates: blue crabs, freshwater eels
 Other: manatee
 Restrictions: no harrassing manatees

DIVING SERVICES

Instruction available: resort course, open-water certification, advanced open-water certification
 Equipment rental: mask, fins, snorkel, weight belt, weight, tank, backpack, regulator, BC, BC with inflator, pressure gauge, compass, full wet suit, partial wet suit, game bag, dive light, camera
 Equipment sales: mask, fins, snorkel, weight belt, weight, tank, backpack, regulator, BC, BC with inflator, pressure gauge, depth gauge, compass, full wet suit, partial wet suit, knife, game bag, dive light, camera, fishing tackle
 Equipment repair: excellent
 Camera repair: none
 Air: to 3000 psi
 Guides: excellent

DIVERSIONS

Ground transportation: bus, rental car
 Shopping: fair and reasonable



Restaurants: fair and reasonable
 Nightlife: fair
 Other sports: houseboat rental, sailboat rental, canoes, golf, tennis, deep sea fishing
 Don't Miss: Weeki Wachee, Indian temple mound archaeological site

JUST IN CASE...

Hospitals: Seven Rivers Community Hospital, US 19, 795-6560
 Recompression facilities: Shands Teaching Hospital, Gainesville, 392-3261
 Police: 795-4241
 Marine Rescue: Florida Marine Patrol, 800-342-1821

PLANNING

Diving tours: Crystal Lodge Dive Center, Box 456, 795-3171; Plantation Inn, SR 44 West, 795-4211; Port Paradise, W. Port Paradise Rd., 795-7437; Talley's Pro Dive Shop, 267 NW 3 St., 795-2776
 Land tours: Homosassa Springs, US 19 S, Homosassa, FL
 On your own: Airlines: Major airlines fly into Tampa, Orlando or Ocala.
 Airports: Crystal River Airport, 795-6868
 Cruise lines: none
 Marinas: Kings Bay Marina, Box 633, Crystal River, (904) 795-3302; Lewis Fishmarina, 268 NW 3 St., Crystal River (904) 795-2932; Port Paradise Marina, Box 516, Crystal River, (904) 795-7437; Plantation Inn Marina, Box 1116, Crystal River, 32629; Twin Rivers Marina, 6 miles west of US 19 on Hwy 44, Crystal River, (904) 795-3552
 Accommodations: Crystal Lodge Motel, US 19, 795-3171; Holiday Inn, US 19, 795-2111; Plantation Inn, SR 44 W., 795-4211; Port Paradise Motel & Villas, W. Port Paradise Rd., 795-3111
 Campgrounds: Crystal Isles Resort, Rte. 1, Box 160G, (904) 795-3411; Nature's Campground, Box 429, Homosassa Springs, (904) 628-2892
 Bibliography: *Diving Guide to Underwater Florida*, Ned De Loach, New World Publications, 1861 Cornell Rd., Jacksonville, FL 32207
 Random notes: glass bottom boats to see manatee without getting wet

CRYSTAL RIVER, FLORIDA

Where a notation "fair," "good," or "excellent" appears after an item, such as guides or diving craft, it refers to the *availability* not the quality of the services.

HOLIDAY INN/TALLEY'S PRO DIVE SHOP—CRYSTAL RIVER

Crystal River, FL 32629. Phone (800) 238-8000, (904) 795-2776.

RESERVATIONS: Hotel—contact your local Holiday Inn or call toll free (800) 238-8000. Scuba—Talley's Pro Dive Shop, P.O. Box 1224, Crystal River, FL 32629. Phone (904) 795-2776.

LOCATION: Hotel situated on Indian River, 1 mile north of town on Highway 19. Scuba shop located on Kings Bay, one block from town. 50 miles from Tampa and Gainesville.

TRANSPORTATION: Air: Major airlines to Tampa and Gainesville from most cities. Private plane facilities at Crystal River Airport, UNICOM 122.8. Ground: 50 miles from Tampa on Highway 19. Major car rentals in Tampa and Crystal River.

ACCOMMODATIONS: 105 air conditioned double rooms with carpet, cable TV, phone and private bath. Hotel has restaurant, lounge, nightly entertainment, pool, private dock, boat ramp and shuffleboard. Access to tennis and golf. Fishing charters with guides and tackle available. Rates: single \$21-24, double \$26-31, extra person \$4/night, children under 12 free. Major credit cards accepted at hotel.

DIVING AVAILABLE—

Shallow reef yes	Walls no	Drift dives yes
Mid reef yes	Wrecks no	Night dives yes
Deep reef no	Caverns yes	Beach dives no

DIVING EQUIPMENT: Joy, Bristol and Ingersoll Rand compressors, 3500 PSI. 25-30 tanks, 72 cu/ft. 25 rental boats range from canoes to 25' outboards. Boats are fully equipped with 6 hp motors, gas, anchor, oar and line for \$20/day. Life preserver rental \$.25/day. Full retail sales and service with complete line of rental gear. Film in stock.

DIVING SERVICES: CMAS, IDEA, PADI affiliation. 3 instructors. Resort course \$50, full certification \$160, advanced courses \$150. 3 day basic certification course with individualized instruction \$120. Cost half day diving (1 tank) \$30, full day diving (2 tanks) \$50, night dives available.

DIVING PACKAGES: 5 days/4 nights \$214. Rates are per person, double occupancy and include accommodations, breakfast, boat, tank/bac pac, weight belt, unlimited air, U/W film show, t-shirt, welcome drink and orientation party.

Dive Beautiful Crystal River



PORT PARADISE MOTEL AND DIVE SCHOOL CRYSTAL RIVER

P.O. Box 516, Crystal River, FL 32629. Phone: (904) 795-3111.

RESERVATIONS: Port Paradise Motel and Dive School, P.O. Box 516, Crystal River, FL 32629. Phone: (904) 795-3111.

LOCATION: Resort and dive shop are located on 3000' of waterfront on Kings Bay, 150 yards from the main spring. One mile south of town, 50 miles from Tampa and Gainesville.

TRANSPORTATION: Air: Major airlines to Tampa and Gainesville from most cities. Private plane facilities available at Crystal River Airport, UNICOM 122.8. Ground: Major car rentals in Tampa and Crystal River.

ACCOMMODATIONS: 75 air conditioned, carpeted units include rooms, suites and villas, all with private bath, telephone and color TV, some with kitchen facilities. Resort has 2 pools, restaurant with waterfront dining, lounge with entertainment, lighted tennis courts, marina, private dock, boat ramp and shuffleboard. Golf and fishing available. Rates: \$24.50-32.50 depending on type of room. Major credit cards accepted.

DIVING AVAILABLE—

Shallow reef yes	Walls no	Drift dives yes
Mid reef yes	Wrecks no	Night dives yes
Deep reef no	Caverns yes	Beach dives no

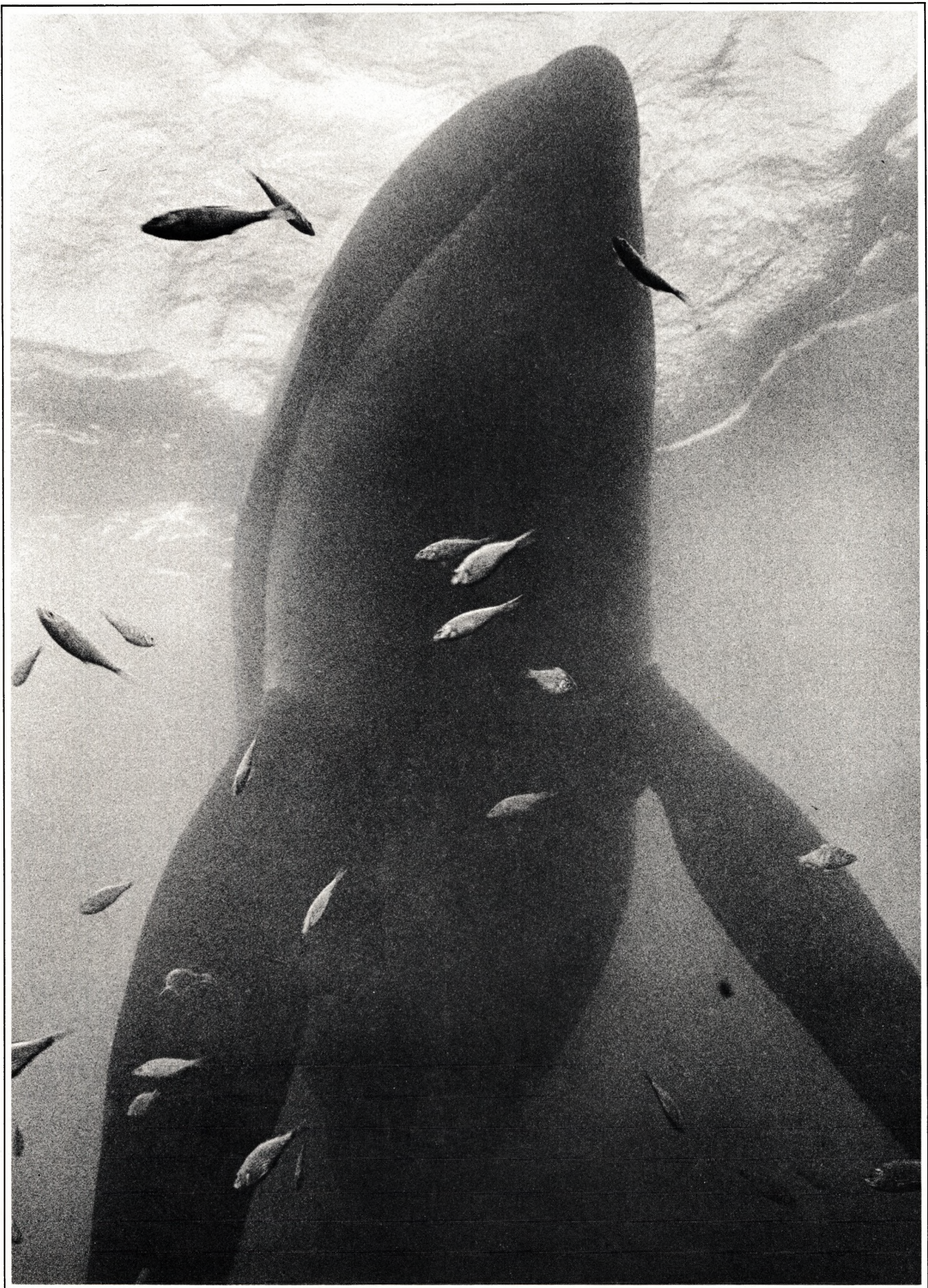
DIVING EQUIPMENT: Ingersoll Rand compressor, 5000 PSI. Twelve 72 cu/ft. steel tanks. Fifteen Jon boats available for rent ranging in size from 16' to 20'. Boat rental rates, 1/2 day \$14.50 (1 tank) full day \$18 (2 tanks) includes gas, anchor, dive flag and life preservers. Complete line of rental gear available. Film in stock.

DIVING SERVICES: PADI, SSI affiliation. One instructor and one divemaster, CPR first aid trained. Full certification course (5 day) \$135, advanced open water \$170.

DIVING PACKAGES: The dive school offers a complete selection of programs and vacations ranging from 2 day open water course to 5 day advanced open water. Costs include lodging, tanks, bac pacs, weights, boat dives, round trip transfers and taxes. Dive school facilities include on site marina, 2 swimming pools, dive shop and school, rental boats, restaurant, lounge and tennis courts.

Port Paradise MOTEL AND VILLAS CRYSTAL RIVER, FLORIDA





Portfolio:

The past twenty years in black and white.

FLIP SCHULKE



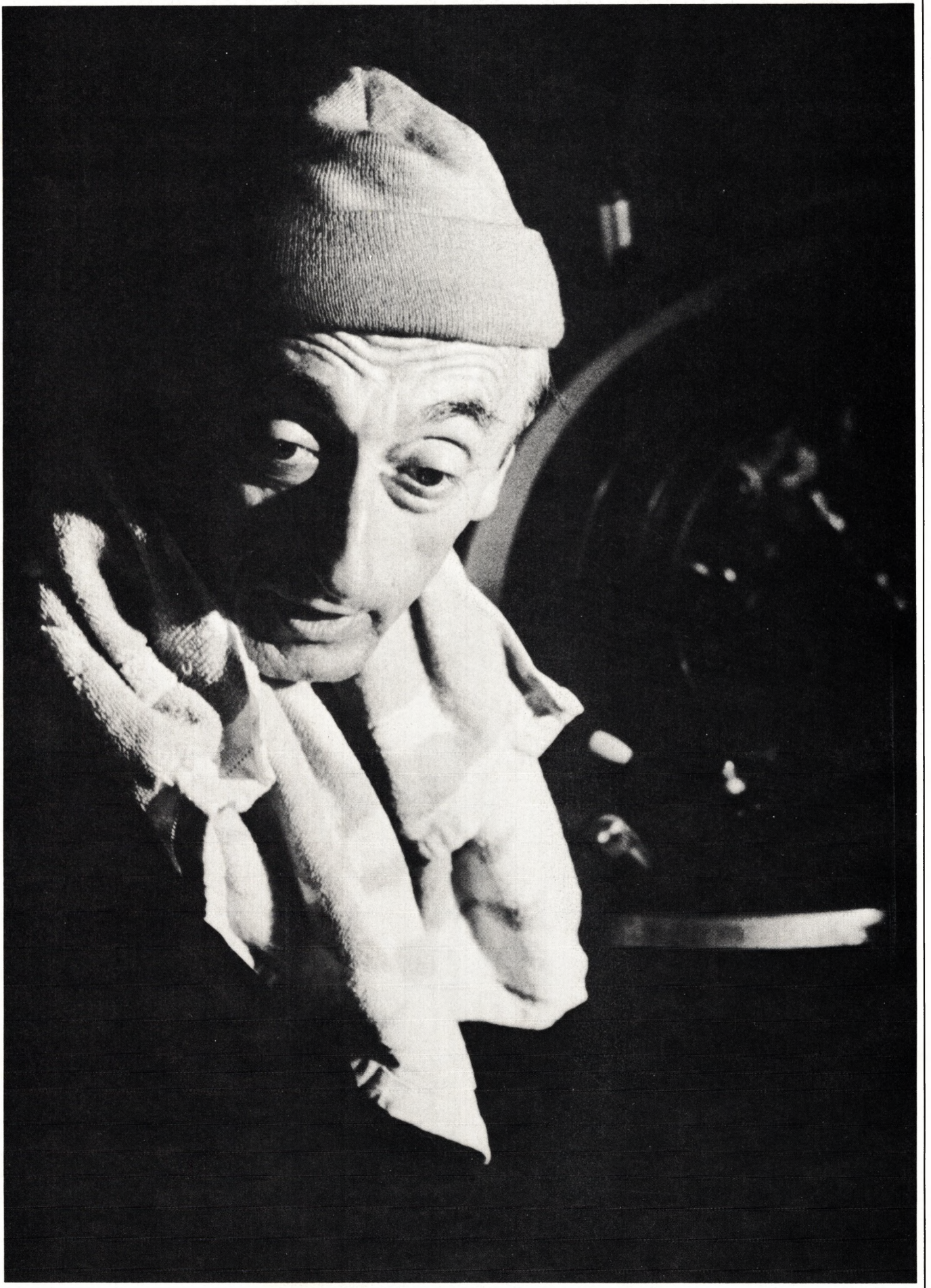
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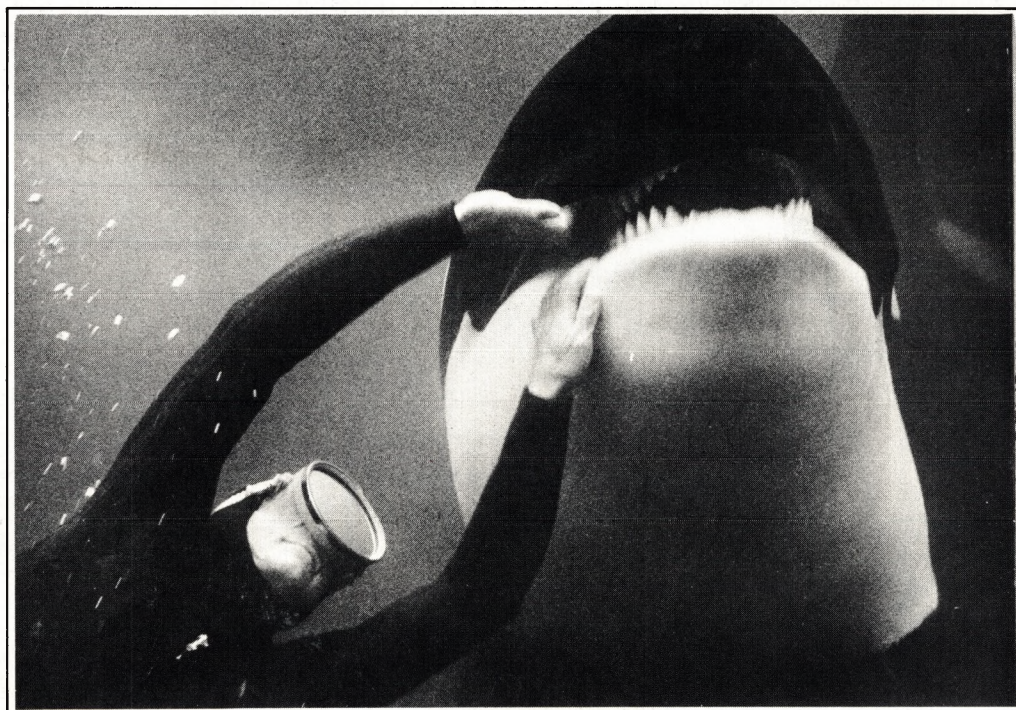


Teacher, artist and photojournalist Flip Schulke broke ground in the field of underwater photography 20 years ago. He pioneered techniques which molded subaqueous photography and made him a legend. He also has an international reputation as a photojournalist, having been featured in National Geographic, Time/Life, Look and Newsweek Magazines.



continued





expand your horizons



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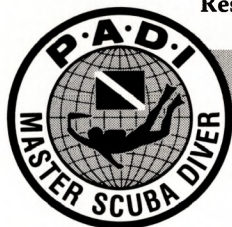


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- Become a diving leader

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Equipment Specialist Wreck Diver
Underwater Hunter Cavern Diver
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HOW TO ENROLL

Contact a PADI
Training Facility or PADI
Instructor. A list of Training
Facilities is available at
PADI Headquarters.

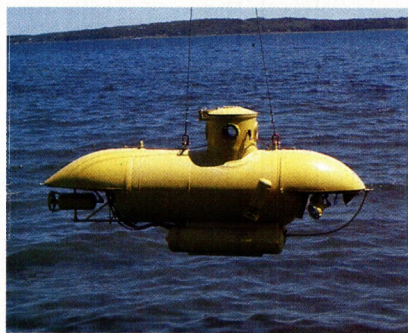
PADI Headquarters
2064 N. Bush St.
Santa Ana, CA 92706



PADI

TODAY'S LEADER IN DIVER EDUCATION

FOR YOUR INFORMATION by Ro Sheffe



Run Yellow, Run Deep

Kittredge Industries, builder of little yellow micro-subs for sport and commercial use, has unveiled its 1980 line. The new K-600 is a 14-foot dry sub capable of dropping two passengers to 600 feet in armchair comfort. The pressurized sub uses a complex rebreathing system monitored and controlled by an oxygen analyzer to scrub carbon dioxide from cabin air and keep it fresh for as long as 80 hours of continuous use. Tested to nearly double its 600-foot cruising depth, the new sub has a safety margin of more than 400 feet, permitting depths of up to 1000 FSW for short periods. Like its older sisters K-250 and K-350, the new K-600 also is little and yellow (after the Beatles, who would paint a sub any other color?) and can be yours for a mere \$125,000 plus tax, tag and title—bring in your old 250-foot clunker for a trade-in estimate, and take one for a test dive.

New Wet Cam Takes TV Underwater

Ready for more underwater footage on TV? A new underwater video camera manufactured by Ocean Realm Products, Inc. may soon be available to the industry, significantly reducing underwater production costs. A joint venture of Ocean Realm Corporation and Belcher Industries, ORP will produce the new camera for distribution by Sony. ORP currently manufactures the new HL-79A broadcast model and two other models for underwater industrial inspection systems. ORP President Richard Stewart designed the HL-79A camera series. As a professional underwater photojournalist and cinematographer his experience in network television includes positions as cameraman, producer and marketing executive with such productions as *CBS Sports Spectacular*, *In Search Of*, *Time/Life Home Box Office* and *ABC's Good Morning America*. More information is available from Ocean Realm Corporation, Box 370293-S, Miami, FL 33137.

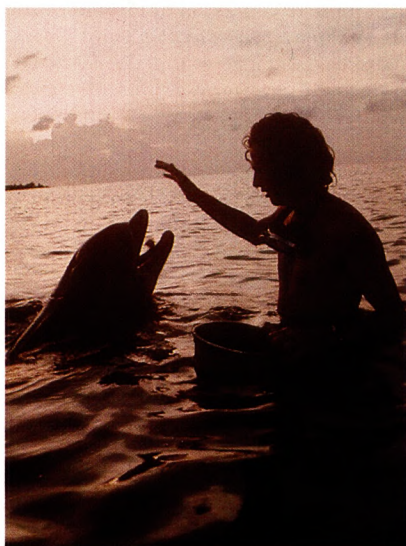


Regulator Recalls

Two manufacturers have announced recalls of regulators that are UNSAFE TO USE until they have been serviced by factory authorized dealers. The voluntary recall decision by Dacor Corporation and U.S. Divers Company includes all Dacor "Pacer" regulators shipped from the factory before August 1, 1979 and all U.S. Divers "Calypso" models 1083 and 1084 sold since 1971 under the name Aqua Lung. Divers are warned to immediately



stop using these regulators and to return them to the factory or to an authorized dealer for corrective repairs at no charge. Dacor Corp., 161 Northfield Rd., Northfield, IL 60093, (312) 446-9555; U.S. Divers Co., 3323 W. Warner Ave., Santa Ana, CA 92702, (714) 540-8010.



Friends in Need

They may not know much about music, but dolphins know what they like. They like Joni Mitchell, Stephen Stills, David Crosby, John Sebastian, Richie Havens, Jimmy Buffett, Fred Neil and Odette — all

of whom at one time or another have come to Miami to sing and play to Ric O'Feldman's friends (that's Ric at left, sharing food with a friend). If you don't remember Ric, he's the former trainer of Flipper, star of the late TV show of the same name. He's also one of a handful of people credited with dramatically increasing the effectiveness of the Save the Whales campaign by sharing the concept with — rather than boycotting — the Japanese people. A 1977 Tokyo benefit concert organized largely by Ric featured Jackson Browne, Country Joe McDonald, Terry Reid, J.D. Souther, Lonnie Mack, Peter Childs, Mimi Farina, Louisiana Red, Odette, Havens, Sebastian and many others. It was bigger than Woodstock, it was the first benefit ever held in Japan, and in three days it did more for the whales than years of boycott had. But Ric is back with his old friends again, and what he's doing now is most astounding of all. If you haven't already seen a TV documentary about his work, you will soon. Get the whole story in the March/April issue of *Sport Diver*.

Save Our Shops

The news from the Department of Commerce, predictably, is both good and bad—good for sporting goods manufacturers, bad for retailers. The 1979 numbers are in, and it looks like another good year for makers of the stuff we use. The U.S. sporting goods industry, Commerce says, should experience continued two-figure growth rates over the next four years—1979 sales rose 12 percent over 1978 sales. But many small retailers are withering on

the vine, their profits sapped by mail sales and discount houses that siphon off a growing market share. "In the past the specialized trade was the main partner of industry," Commerce points out, "but today 70 percent of all sales are made through the chain and discount retailers." Think about that the next time you save a dollar or two by buying from the biggies. Air fills and reliable dive advice are difficult to obtain from a mail-order catalog.

continued

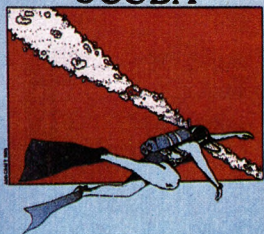
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FOR YOUR INFORMATION *continued*

Cayman Saves

Prodded in the pocketbook by rising fuel costs, Cayman Airways has decided to take desperate cost-cutting measures—conservation. By implementing a fuel-saving program, CA says it can cut by 200 gallons the amount of jet fuel needed for each Cayman-to-Miami round-trip flight. Fuel is conserved by flying at higher altitudes where fuel efficiency is better, by making less-frequent use of auxiliary power on the ground and by cruising at a slower speed that adds less than five minutes to the Cayman-to-Miami flight. At 11 flights per week, CA estimates it will save \$102,960 annually. Wait a minute—that means CA gets gas for 90 cents per gallon. Where can *we* get some of that stuff? The price is right, and I'll bet jet fuel would cruise my car at a higher altitude, too.

Derelict Drums Disguise Dangers

Unlabeled steel drums found floating offshore may contain extremely hazardous substances, warns the Third Coast Guard District of New York. Transported as deck cargo, many drums of exotic chemicals are lost overboard annually, their warning labels washed off by wind and seas. The Coast Guard warns that even empty drums may contain explosive or corrosive residues dangerous to touch or smell. If you see one, stay away from it, determine its approximate position and report it to the Coast Guard as soon as possible at 1-800-424-8802; it's toll-free.



Bored of the Rings?

Maybe it's all the bad press our venerable institution of marriage has received lately. The lost wedding band discovered on Molasses Reef off Key Largo, Florida last April still remains unclaimed despite the fact that it was found less than a week after the inscribed wedding date and was widely reported locally and in at least two national watersports publications. Now there's another. Diving on Eden Rock off Grand Cayman Island, Susan Gin of Dallas, Texas found a gold wedding band inscribed with the owners' initials and wedding date. She is holding the ring for identification: Call (214) 348-8040. The band found off Key Largo is being held by Divers World at (305) 852-5498. These people would very much like to re-unite all this jewelry with its proper owners. If either of these could be yours; give them a ring (a lame pun, but better than none) at the above numbers. Next time, darling, wear it in your gear bag.

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Tortuga "Loggerhead"

Save the Turtles, Stamp Out Tyrants

Five endangered species of Atlantic sea turtles are commemorated in a new postage stamp issue from Nicaragua. The issue includes five stamps in values of 90 cents to 20 *cordoba*, featuring lithographic reproductions of loggerhead, green, Atlantic ridley, hawksbill and leatherback turtles—all depicted in an underwater environment. Nicaragua, which has taken steps to protect the threatened species, is one of the world's greatest turtle breeding grounds and the only place where the five endangered Atlantic species live together. In other news on the philatelic front, the sudden departure of a member of another endangered species—despotic dictators—has engendered a new stamp issue from Uganda. Following the coup that ousted Idi (Big Daddy) Amin, all stamps bearing his portrait have been recalled and issues currently on sale have been overprinted with the slogan "Uganda Liberated 1979." Collect and trade with your friends—I'll give you an Amin and two Somozas for a Shah.

continued

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The Sea Scrubber System is the result of eighteen years of research and development in manufacturing hull cleaning equipment. The Sea Scrubber is designed to clean a vessel of any size but is the most efficient for workboats such as fishing trawlers and cargo vessels up to four hundred feet in length. The Sea Scrubber is capable of cleaning an area up to 3800 square feet per hour. For larger ships such as tanker and container cargo type vessels, we recommend our brush cleaning submersible, **Brush Sub**, which is unequalled for high performance and efficiency.

As well as being excellent for cleaning large commercial swimming pools, the Sea Scrubber's power unit can also be utilized for hydraulic tools such as chain saw, hydraulic drill, cable cutter, impact wrench, etc.

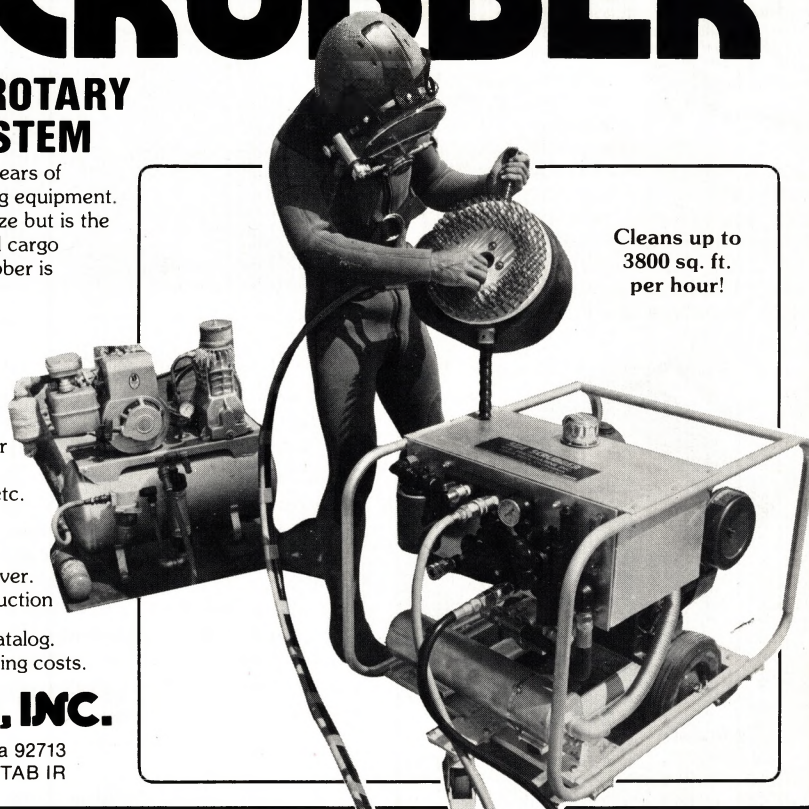
A single floating, twin hose system provides power to the Hydraulic Brushing Head. Dual rotation and power control are diver operated with a single control lever. Forward motion is achieved by brush rotation and the suction power of the system.

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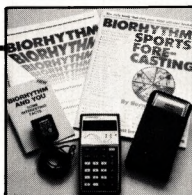
There's safety in numbers, especially underwater, where experts recommend diving with a partner.

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RESORT UPDATES



U.S./British Virgin Islands

Sail and dive the Virgin Islands aboard *Bantu*, a completely dive-equipped catamaran with three private staterooms. The 50-foot sloop cruises the U.S. and British Virgin Islands, offering six days and seven nights of VI dives from Buck Island to the wreck of the *Rhone*. Contact Sea Safaris, P.O. Box 512, Manhattan Beach, CA 90266.

Cortez Connections

Air service to some of the most remote areas of the Mexican Baja and the Sea of Cortez has been instituted by Air Cortez Airline. Twice-daily flights depart Ontario on Thursdays, Fridays and Saturdays and return twice daily on Saturdays, Sundays and Mondays. Groups of four or more can be picked up at any airport in southern California. Three- and five-day diving packages including round-trip airfare, dinners, two tanks a day and gear rental start at \$287. Contact your local travel agent for details.

South Caicos Charter Flights

Round-trip air service directly to South Caicos Island from Miami, Florida is now available through Co-Pilot Travel in cooperation with Turk-Cai Watersports, Ltd. The charters will serve both individuals and groups planning a week's stay at the Admiral's Arms Inn. Hotel and flight reservations can be made through Co-Pilot Travel Consultants, 6201 Leesburg Pike, Falls Church, VA 22044 (800) 336-0173.

HAWAIIAN DIVERS

Dive Center New on Oahu

Hawaiian Divers' new shop in Honolulu, designed as a full-service sport diving center, offers "the widest selection of diving equipment in the state and the largest refrigerated scuba air system," says shop manager William Burch. The new Oahu facility features all levels of dive instruction by Kirwan's School of Diving and expert equipment repairs by Ricky's Scuba Service. Hawaiian Divers, Box 572, Kailua-Kona, HI 96740.

Taking Care of Business

Thumbs up and a pat on the backpack for Stuart Sorg, owner of the Coconut Grove Scuba Shop in Miami, Florida. Never one to shirk community responsibilities, Sorg has been elected president of the Coconut Grove Chamber of Commerce, a group of civic-minded merchants in the residential waterfront village within Miami. Besides his new Coconut Grove post, Sorg has also been named by the Miami City Commission a member of the prestigious Miami Waterfront Board. An open water instructor since 1974, Sorg has taught more than 1000 PADI students including his two sons who work with him in training classes. In case you were wondering what a man with so many community involvements does with his spare time, Sorg does weekend duty as a UDT/SEAL reservé officer. Congratulations, Stuart, and a hearty "fire-in-the-hole" from the *Sport Diver* staff.

New Tampa Training Center

Florida Scuba Diving Institute has announced the opening of a new retail store and training complex in Tampa, Florida. Described by operations director Eugene Stover as "one of the most complete training centers in the country," the new complex boasts a 3000-square-foot sales area stocked with complete lines of Dacor, U.S. Divers and Selpac equipment. The training center includes a 266,000-gallon pool with a 30- by 30-foot deep well, a large lounge, a juice bar and game room. Adjacent to the pool and bath house is a sauna and steam bath. Director Stover holds seven specialty instructor ratings, and offers a wide variety of basic and advanced courses. Contact Florida Scuba Diving Institute, 1010 South 76th St., Tampa, FL 33619.

Jacksonville Instructor Training

A new East Coast instructor training center offering programs for those interested in a career as a professional diving instructor has opened in Jacksonville, Florida. Florida Professional Diving Instructor College, an affiliate of Ed Brawley's Professional Diving Instructor College, offers a ten-week resident course, a two-week concentrated course and a special weekend program for students within driving or flying distance. For a free catalog, write Florida PDIC, 5627 Arlington Rd., Jacksonville, FL 32211.



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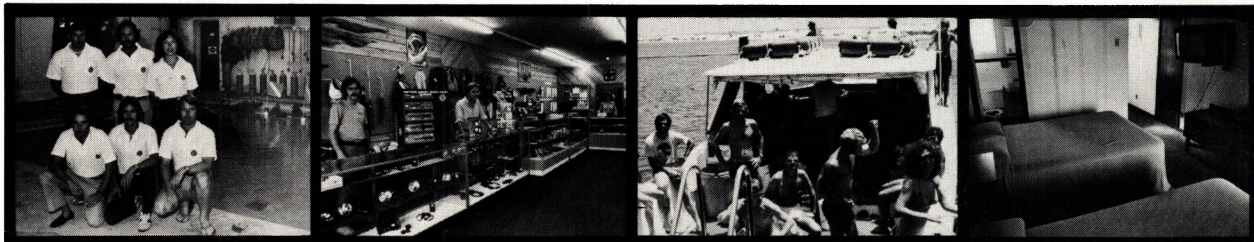
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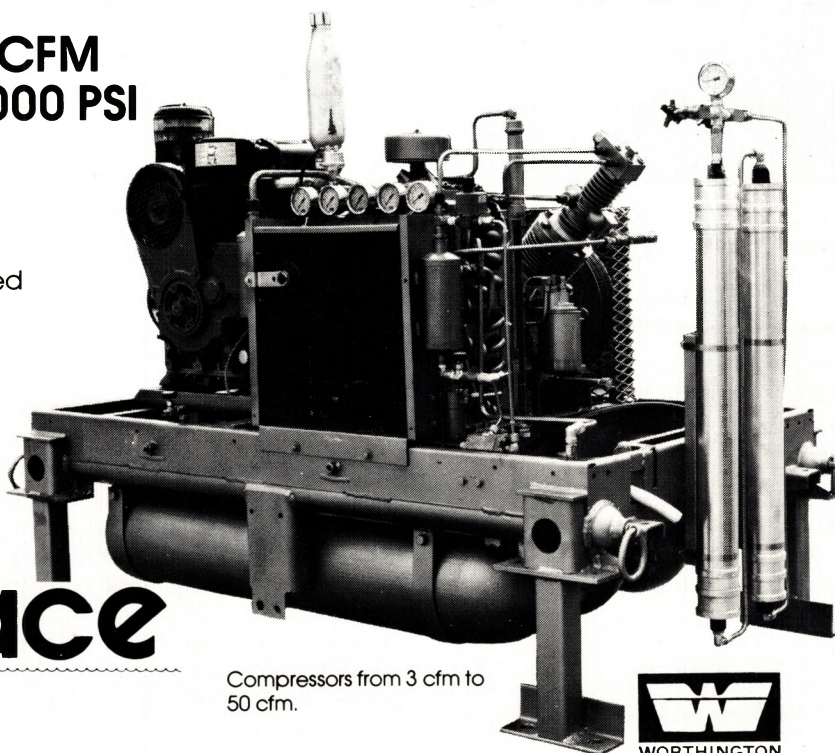
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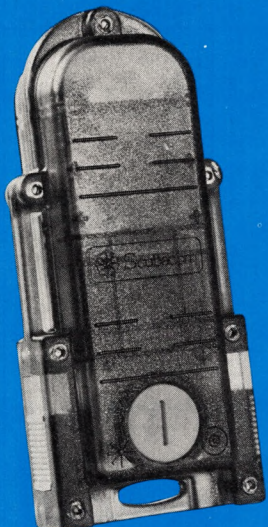


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INSTRUCTOR NOTES

The Diver's Log

Like prints on Kodak paper, it's made for preserving memories.

Entry: Dive #2045, 9 July 1979, off Quiescence I, Molasses Reef, Pennekamp Park. Buddies: Tom and Tommy (13 yrs) Fulton. 83°F, calm, 50' vis. Max depth: 30'; time: 70 min. Circled cone coral looking for Fred, the famous, *friendly* moray. Found him — seemed aggressive. Offered ballyhoo, hand-held. Fred took it, came back for more, bit (bare) left hand instead — twice (ouch!) — then took bait *and* part of right index knuckle through glove (ouch!). "Friendly" Fred is *not*! Streams of green blood, controlled by direct pressure. Later Fred found me again, twisted through legs, up chest, and around neck. Feared for vital parts. ... No more food for Fred! — Lou Fead.

BY LOU FEAD

It's a ragged book, my current dive log, grown almost as weather-beaten as I am because it goes with me on every dive, rain or shine, boat or beach. It's *that* important to me, this record of one of the most important aspects of my life.

A lot of divers seem surprised that such a grizzled diver should carry on with what they consider to be an immature, silly ritual — logging each dive and asking buddies to sign it like a high-school yearbook — something only a novice would do. But, because there *are* some important reasons for continuing this seeming triviality, I still write

Lou Fead is an instructor, author of Easy Diver, and has directed several International Conferences on Underwater Education for the National Association of Underwater Instructors.

faithfully in my log after more than 2000 dives, and I recommend that all serious divers do the same.

So, why log? Is it a legality? A requirement for all divers? For some it is.

As an instructor, I do it partially because my certification agency says I must show proof of having made 12 dives each year to remain active. Plus, a well-documented log could help defend me if I were ever hauled into court.

Non-instructors are not really saddled with these requirements, however, although some agencies do require a certain number of dives logged — or other proof of experience — for advanced ratings. For instance, to become a NAUI Divemaster, you must have logged at least 25 dives.

But there are other reasons — of equal importance to me, too — for a

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How Clearoptic Super-Visibility Lenses were developed for divers.

John Todd of John Todd Optical Company, the largest optical company in Ohio, has been diving around the world for years. He has never been satisfied with the decreased visibility of ordinary masks.

Putting his 20 years of optical know-how and his full-time staff of opticians and his laboratory to work, he set out to develop a low cost, personally fitted diving mask that would give any diver optimum visibility, at any depth, in any kind of water.

How Clearoptic Super-Visibility Lenses capture light to increase color perception.

Clearoptic Super-Visibility Lens is made with a special yellow glass. Since this special yellow is in the middle of the color range which the human eye can perceive, the lens captures and magnifies all available light.

Your eye receives thousands more color impulses than it would with an ordinary face mask lens. This increase in color impulse absorption allows you to retain up to 80% of normal color perception — underwater!



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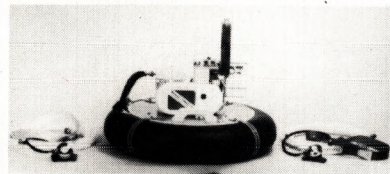
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INSTRUCTOR NOTES *continued*

sport scuba diver to keep a log. Many divers, from basic to instructor, believe that logging is as much a part of diving as getting ready, washing gear, or descending into the water itself. I believe that now, too, even though I didn't always — much to my regret.

During my first four years of diving, I must have made about 150 dives — I don't know exactly how many because I didn't bother to log any. Of those dives, I can now recall only five, because they ended in some sort of catastrophe.

What happened to the majority of the dives, the ones with pleasant memories? When did I first thrill to the casual, graceful flight of a nearby stingray, find my first abalone without help, catch my first bug? These are the moments that make sport diving worthwhile, memorable — the moments that have really kept me diving all these years. And they do fade with time, no matter how vivid they may be, unless they're recorded when they happen.

Entry: Dive #107 ... Los Islotes wash rocks off Baja, from Baja Explorador ... Touched a sea lion for the first time ... felt so good! Watched a herd at play — beautiful, graceful, curious. Great eyes staring at me with interest and friendliness ... found exquisite Spanish Shawl nudibranch ... Saw black coral at 40 feet! Dive time, 30 min. — too short ... too short! — From the Dive Log of a buddy.

Now, that's the real reason for keeping a dive log — to capture that kind of memory. Without a log entry, it would be just a fleeting joy, a physical exercise, something to look back on with a blank stare. Without logging, a dive is, by-and-large, lost forever.

Esoterics aside, however, a dive log is more than just a lover's diary. It can be an encyclopedia of pertinent diving information: location and phone numbers of nearest chambers, oxygen sources, boats, shops and buddies; little maps pinpointing the best lobster spots; purchase price and serial numbers of new equipment; visual inspection dates, etc. Many printed logs contain dive tables, signal charts, checklists, first aid procedures, and space for phone change.

So what should you log, and in what kind of book? There are numerous commercial logs on the market, with varying formats and amounts of data to record. Most encourage entry of date,

day, type and purpose of dive, buddies, location, water temperature and visibility, dive depth and time and remarks for each dive. Some go a bit overboard by asking for details that could be useful only to a meteorologist.

It's probably a good idea to use one of these formal, detailed logs at first until you learn exactly what you do want to log — which is *anything you feel will be personally useful a month from now*. After you know, you can use anything as a log. My own is one of those 365-page personal diaries bought in July at half price.

Once you have a log, you have to write in it. Just owning it and promising to write are not enough. Many go that far, yet have empty logs because they keep saying, "I'll start *next* dive."

Two tricks that have helped some, like me, become willing slaves to the dive log habit are: (1) take your log on every dive and (2) log your dive as soon as possible after surfacing.

Keep a log in your dive bag, the pocket of a favorite diving jacket, or on your boat — something that goes with you on every dive. Then you'll have it where the action is. Take a pen along too, but not a felt-tip job (a great way to lose memories the first time you drop it in the beer cooler!).

Log your dive immediately after it's over. Force yourself to wipe your hands and write while the dive is fresh. Waiting until you return home to a dry desk often leads to forgotten details, or no entry at all.

Entry: Dive #1998 ... La Jolla Cove, CA ... With new buddy: Marty Siegel ... Bugs everywhere! Excitement! Greed! Marty breathed his tank down first ... shared mine (with bipus) to make a good dive longer. Limited Out!

Through logging, each dive becomes a permanent part of your life, ready to be re-lived at the turn of a page. The camaraderie of buddies once felt in the water is tucked into words for re-experiencing years later when two meet again. The excitement of discovery lies latent in the log ready to tingle anew in reading the description of a nesting garibaldi. The thrill of intimate involvement lingers silently under an old account of feeding yellow tail snappers together. Such moments and memories are beyond value. So is the dive log that holds them!

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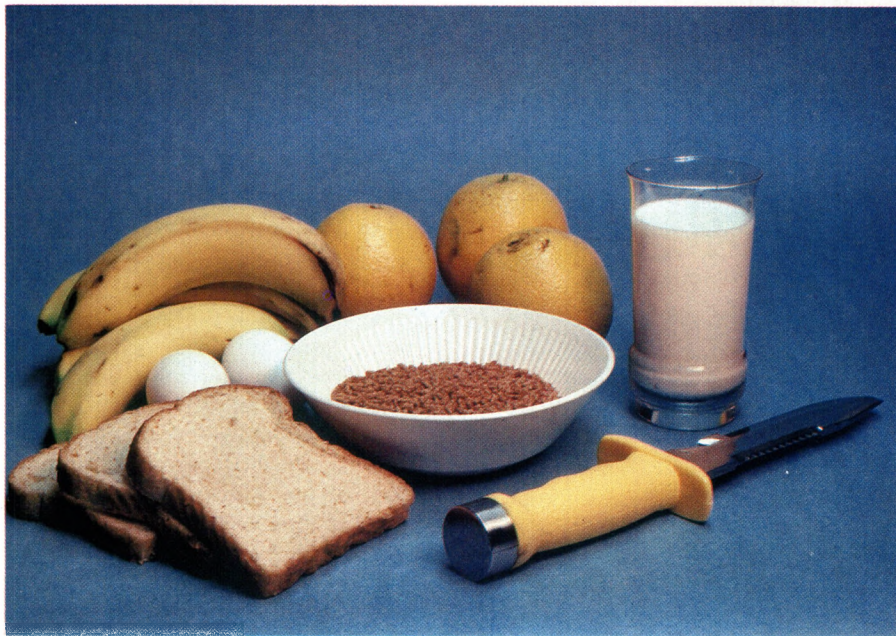
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The Diver's Diet

Your instructor probably never told you that to be a diver you have to eat like one. Eating right every day is important, but there are also special supplements you'll need the day of the dive.

BY SUSAN BANGASSER, Ph.D.



In preparing for a day of strenuous activity, don't forget your diver's diet. What you eat will determine how good you feel and even how much you enjoy the dive.

A diver has many nutritional needs. First you must satisfy your body's requirements for regular maintenance, growth and energy. You should be particularly interested in maintaining healthy lungs, a good blood supply and healthy muscle tissue. If you are exercising regularly, you have even more nutritional needs. To meet all these requirements, a balanced diet is necessary.

Protein

You need to consume protein every day. Protein is not stored, instead the excess we eat is converted to fat. Since the cells in our bodies are in a continuous cycle of growth-death-replacement, we need

this protein to maintain healthy cells.

If you are active, you'll need protein to build or replace muscle tissue. Despite this demand for protein, our needs have been overrated. Athletes no longer consume a large steak prior to a competition. The protein and fat take too long to digest and do not provide instant energy. If you eat the right amount of protein every day, you will not need to consume more on the day you dive.

Complete protein is found in meat, poultry, fish, eggs and milk. You can also obtain protein from grains, beans and nuts, but these are incomplete proteins. By combining grains with other foods, the protein is completed. For example, cereal and low-fat milk is a good protein source and a good breakfast.

Carbohydrates

Carbohydrates, also called starches and sugars, are important for divers. You should derive your carbohydrates from foods like breads, cereals, fruits and vegetables. Some of the carbohydrates you

consume will be stored in the muscles and the liver as glycogen. This is your emergency energy supply. If you are engaged in a strenuous activity, your body will first use the available blood sugar and then tap stored glycogen. If you consume more carbohydrates than can be stored as glycogen or used as energy, the excess is stored as fat.

Exercise stimulates the muscles to store more glycogen, so sedentary people convert more carbohydrates to fat than active people do. Therefore, physical conditioning not only keeps the muscles primed, but lowers your tendency to form fat. The day of your dive you will be able to expect more from conditioned muscles. The muscles you condition, the leg muscles for instance, are the ones that store the extra glycogen. Exercising your arms will not improve the energy available to your legs.

Fat

Some fat is needed in a balanced diet. Although your muscles prefer carbohy-

Dr. Susan Bangasser is a hyperbaric physiologist and researcher, a NAUI instructor and co-founder of NAUI's Women's Helpline.

continued

drates, fats are important as an energy fuel during extensive or prolonged exercise. Fat cells continually burn out and are replaced, so the fat you consume replaces the old fat. Also, several fat soluble vitamins are found in some sources of fat, such as butter. Consumption of fat helps you absorb these vitamins. And since fat takes longer to digest, it helps a meal stick with you longer. Meat, milk, cheese, butter, margarine, oil and nuts are good sources for fats.

Consumption of excessively fatty or greasy foods prior to a dive may cause problems. Combined with a long boat trip or a long surface swim, they can cause indigestion or nausea. Stick to foods that are easy to digest before a dive: pancakes, toast or cereals. Foods to avoid include bacon, sausage, pizza and others that are high in fat content.

Vitamins

Some vitamins are stored in the body, so even if your diet is deficient in them one day, you probably have an ample supply. These are the fat-soluble vitamins A, D, E and K. Other vitamins are not stored and must be consumed daily. These are the water soluble vitamins, including the B complex and C. Vegetables, fruits and whole grains are good sources for vitamins. If your daily diet includes these items, you've probably been getting enough vitamins. If you are on a diet of less than 1800 calories per day, you may need a vitamin supplement.

I do not believe anyone should take megavitamins without consulting a physician. High doses of vitamin A can be toxic, and high doses of one B vitamin can induce a deficiency in another.

Vitamins basically assist in cell function and maintenance. A and E are important for the growth of epithelial and mucosal cells which line the lungs. Folic acid and B₁₂ are important for red blood cell formation, enabling good oxygen-carbon dioxide exchange. Vitamin B₆ plays a role in the conversion of carbohydrates to sugars, which are readily used as a primary energy source.

Minerals

Minerals work with proteins, carbohydrates, fats and vitamins to provide a healthy, well-functioning body. There are a few minerals worthy of particular attention by the diver. Iron, along with copper and cobalt, is important in red blood cell formation and hemoglobin synthesis. Hemoglobin is the protein in

the red blood cells that carries oxygen to all the other cells. Liver, lean meat and egg yolk are good sources of iron. Some women are deficient in their iron supply due to periodic menstrual loss. This causes an inadequate red blood cell supply, or anemia and a feeling of tiredness or being run down. A physician may prescribe an iron supplement for this condition. Pre-menopausal women should maintain an adequate iron supply with proper diet or an iron supplement.

Potassium influences the contractility of your muscles. During periods of strenuous exercise, particularly on a warm day, excess perspiration can cause a depletion of potassium. This can lead to exhaustion and muscle cramps. Severe depletion of potassium can even lead to cardiac arrhythmia and possibly cardiac arrest. A diver carrying heavy gear, suiting up and then diving can seriously deplete the body's supply of potassium. Prevent this by eating such foods as bananas, oranges and dried fruit. Drink water or an electrolyte-balanced drink, such as Gatorade.

In the past, athletes and others who worked hard on hot days were told to take sodium tablets. A normal diet supplies plenty of sodium. In recent studies on the training of football players, potassium, not sodium, was found to be the important mineral in preventing heat exhaustion and muscle cramps.

Calcium and magnesium are important to good muscle function. A depletion of either can lead to muscle cramps and spasms or chronic fatigue. Calcium can be gotten from milk or cheese. Magnesium is found in a variety of plant foods such as wheat or nuts.

Day of the Dive

The day of a dive, you should have a proper breakfast. Any of the following are good choices: eggs (not fried), toast, jelly, pancakes, sweet rolls, waffles and juice. Some people have problems when they drink milk before a dive. Milk may be difficult to digest or it may promote mucous production. If you want it, drink non-fat milk. You should avoid eating greasy foods and any that may cause gas production such as bacon, sausage, pizza, carbonated drinks or beans. Coffee and tea should be avoided because of their diuretic effect. Alcoholic beverages are not permissible because they not only affect your judgment, but also dilate your blood vessels.

If you plan on diving immediately after eating, have a light meal high in carbohydrates. If you have a substantial meal, wait one to three hours to allow time for some nutrients to be absorbed.

During the day, frequently drink water or an electrolyte-balanced solution designed to replace important minerals. On hot days, you may perspire profusely even before the dive. During the dive you will lose a lot of water because your body must add moisture to each breath of air. Your tank is filled with very dry air.

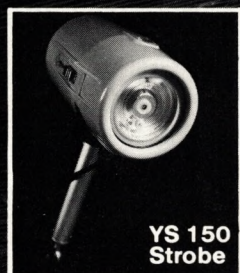
Other meals during the day should follow the same pattern as breakfast: some protein, high carbohydrate and low fat. You will be using lots of calories—the amount used varies according to your size, activity and the air and water temperatures. Estimates of the number of calories *over and above* those necessary to maintain minimum functions are: For beach dives, 1800 for one dive, 3300 for two dives; for boat dives, 2300 for two dives, 3400 for three or 4500 for four. These estimates include carrying gear, suiting up, entry, dive, exit and removing gear. The beach dives were estimated for moderate surf conditions. You use the calories not only through physical exertion, but also through loss of body heat to the water. Besides these calories used in diving, you will need an additional 1400 calories for normal body functions.

One way to consume a lot of calories and still provide useful nutrients is to make a concoction known as gorp. Originally developed by mountain climbers, a general recipe is: one box of granola cereal, seven ounces of peanuts, seven ounces of cashews (other nuts can be substituted), one large box of raisins, and a half-pound bag of M&Ms. Mix these together in a large bag and serve.

In between dives or immediately after a deep or repetitive dive, avoid alcoholic beverages. Since alcohol dilates the blood vessels, consumption could predispose you to a case of decompression sickness. The dilated blood vessels may allow a too-rapid release of nitrogen, and the formation of nitrogen bubbles. Give yourself a couple of hours surface interval before you tackle a cold one.

The diver's diet starts before the day of the dive. Physical conditioning with proper diet is the best way to keep fit and fully enjoy diving. The day of the dive, pay particular attention to consuming energy laden, nutritious foods. A proper diet is as essential as your regulator to an enjoyable day of diving. ☺

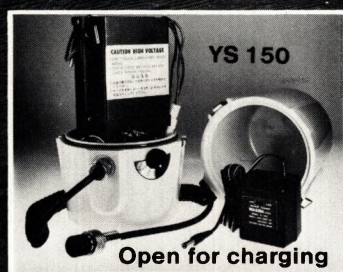
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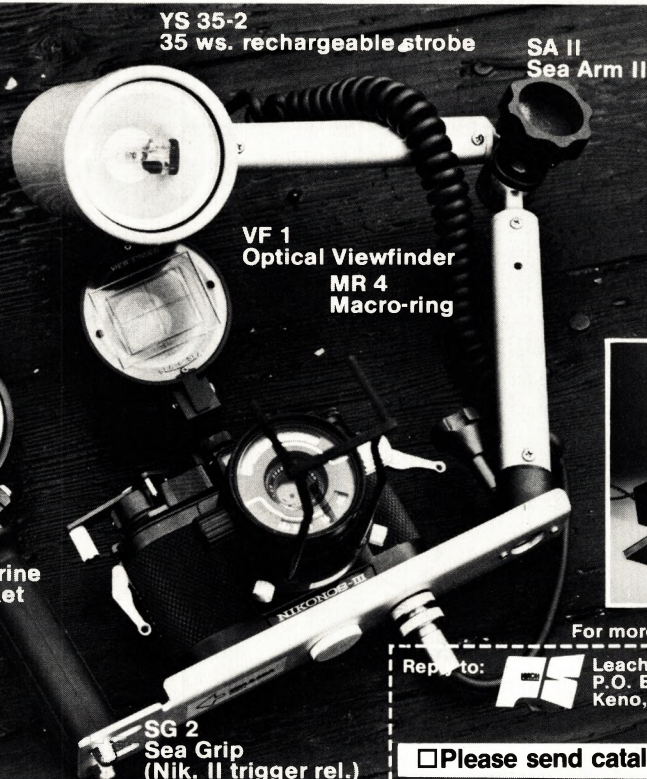
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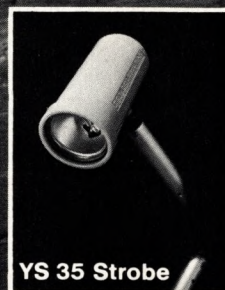


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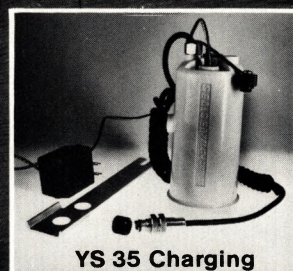


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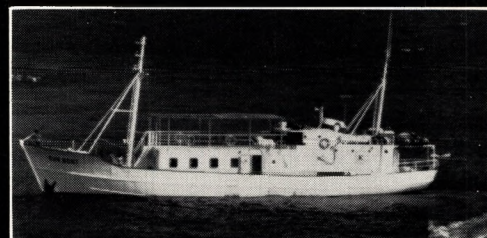
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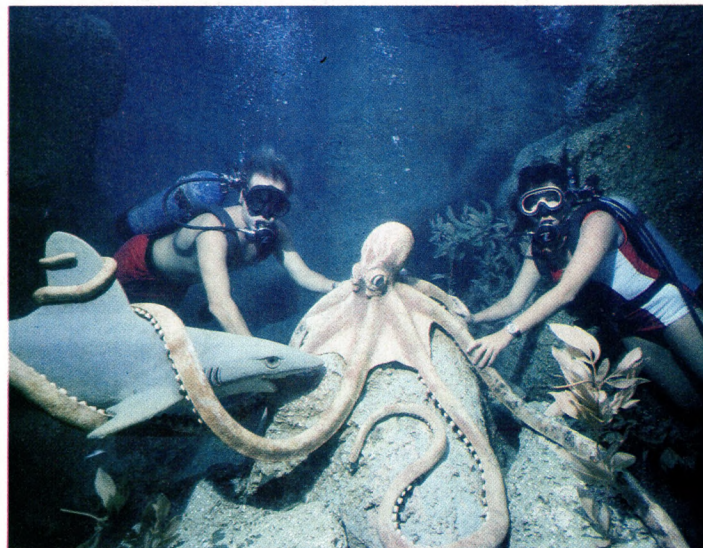
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WORKING DIVER

Fantasyland Maintenance

Disney World's divers work hard, but where else can you dive with paddlewheel steamers and mermaids every day of the week?

BY DEE MOSTELLER
PHOTOGRAPHY BY
FRED BAVENDAM



Animation artists Tom Rodowsky and Jane Polgard inspect one of many underwater displays seen by visitors to Disney World's "20,000 Leagues Under the Sea" attraction.

If a dream could actually be made to come true simply by wishing on a star, one has the suspicion that the average scuba diver would wish, not for riches, but for *the* pluperfect dive site.

And where would that dive be? One man's dream being another's nightmare, it varies. For some it's simply any place where the water's warm, turquoise and full of animals. For others, it's a spot where lobsters grow so big they can scarcely be stuffed into a large-size catch bag.

For those whose imaginations are stoked a little by a touch of chronic narcosis, maybe it's a land of lost ships where treasure chests lay spilling their precious guts onto the ocean floor. Perhaps a cruise beneath the polar cap with only the mystical aurora borealis to light the way. Or even so far as the lost continent of Atlantis where mermaids play among "crumbling bits of stone" that "betray the hand of man . . ."

Now you may feel a little stupid

Dee Mosteller's been gurgling about talking clams and swimming with mermaids ever since she returned. We think she had a close encounter with the high-voltage squid defense mechanism on the Nautilus.

standing out in some field gazing cow-eyed at a winkly-twink in the sky, but there are divers who go to *all* of those utopian places, not just occasionally, but nearly every day of their mortal lives. It is an exclusive band of skilled working divers who practice their own special wizardry in a land noted for its eternal enchantment, the Magic Kingdom of Walt Disney World in Orlando, Florida. They're known unofficially as the Fantasyland SWAT team.

It's difficult to put anything about Disney World into perspective, so far removed is it from the Other World. It does compare to this planet Earth, however, in that its main public areas are about two thirds under water.

Most of the facilities on the 27,400-acre site are built around large man-made recreational lakes, swimming pools, fountains, cruising rivers and splashy water slides. In the heart of "The World," as it's called locally — the Magic Kingdom — are six different lands, or theme parks; each has its own important bodies of water. These range from clear, shallow streams used primarily for decoration and catching wishers' pennies to muddy rivers where life-size, steam-driven paddlewheelers churn daily; to

murky, green Amazonian riverlets where rhinos, crocodiles and elephants rise up suddenly to treat or scare visitors on a jungle cruise; to mammoth falls-spewing monoliths that guard the entrance to Tomorrowland. There are also underground rivers that serve as the bases for such attractions as the charming "Small World" and colorful "Pirates of the Caribbean."

The most famous of the Magic Kingdom waters is the large, turquoise lagoon that hosts one of Disney World's five most popular attractions, "20,000 Leagues Under the Sea." Here, small submarines, appropriately dubbed *Nautilus*, carry millions of tourists each year on an undersea adventure that has little parallel in the man-made world. It is also here that the Fantasyland SWAT team does its best stuff.

Perhaps because of the tremendous emphasis on water, scuba diving is a major reality in Disney World, both as a sport and as a working medium. There is a huge Walt Disney Dive Club, spawned and fed by one security man, Wayne Mitchell, who instructs employees in his spare time. Disney sport divers can use, at will, all recreational waters in the public areas, and have a



Foreman Tom Fulton repairs an actuator switch in a mechanized mermaid that has been waving to Nautilus passengers for the past ten years.

private lake of their very own nearby.

Many of the working divers at Disney come from the ranks of these Mitchell-trained sport divers, and it was Mitchell who set up the rigid annual physical exam and specialty training course required of any staff member who will be called on to dive as part of his or her job.

Divers work in every major section of the World. Security, for example, has many working divers whose unhappy duties are primarily to search for valuables lost by guests and an occasional body. (Where you have water sports, you have drownings, no matter how much magic is on your side, although Disney has had only a minor share of these tragedies.) Outside the main attraction area there are also maintenance divers who keep recreational facilities clear and clean.

But it is the Magic Kingdom divers who spend the most time in the water, keeping the complex system of vessels and underwater animated figures smiling, waving, honking, roaring and ear-wagging at the crowds.

Of the six theme parks, all but Main Street and Tomorrowland have at least one full-time working diver on the

maintenance staff. (Tomorrowland had one, but he was transferred to Fantasyland, the need there is so much greater.)

Fantasyland has four divers because its "20,000 Leagues . . .", with nearly 180 submerged animated figures, ten-sub fleet and maze of tracks and switches, needs constant attention to keep it up to Disney snuff, which is rather fine.

The lead, or foreman in Disney parlance, is Tom Fulton, a husky young man whose normal stock in trade is master building. When I first met Fulton, doing what he usually does on a weekend — sport diving — I nearly flipped when he told me his business address: Fantasyland Maintenance, Magic Kingdom, Disney World, USA. (Lordy, I'd die happy if I had an address like that!) Having had this childish dream of my own ever since I learned to dive, of plunging into those fascinating waters of Captain Nemo, I greedily pumped him for details.

Patient with my greed, he explained that his job is "pretty much like anyone else's," full of mundane things like screwdrivers, pneumatic drills and ear funguses. He did admit there is some sense of magic surrounding it lacking in the job of a tanker-bottom scrubber.

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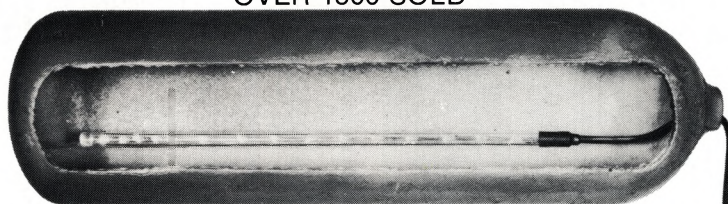


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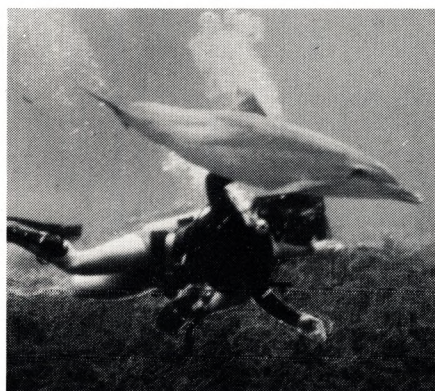
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WORKING DIVER *continued*

It is not, he cautioned, all blues and golds. He works often in other realms of Disney where the water is extremely turbid either from the natural action of boats cruising over shallow dirt bottoms or from dyes put into water to make it resemble the green murk of a jungle river. Sometimes he works in zero visibility; and inside tiny cave-like structures (appearing on the outside as rhinos or coral hammocks) full of wires, pulleys and sharp things. This requires him to have a touching buddy and a top support team of one to three people.

Nor is it all Florida sunshine, for the waters drop to about 40 degrees in winter. But the show must go on. Daily, 365 days a year. "We even have to dive in sewers occasionally," he said, trying to discourage me.

Still and all, to dive in the Magic Kingdom. Visibility and dyes be hanged. I want to go into those Nemo-nian waters, to dive where the levels of human endurance are passed.

It takes more than wishing on a star to get to dive in "20-K," as they call it internally. For a visitor it is next to impossible, so careful is Disney World of its image and its highly guarded technical secrets. Within that relatively small kingdom are millions of dollars worth of complicated audio-animatronics, a system unique to Disney whereby movements and sounds are combined and synchronized electronically to create next-to-life action in such inanimate objects as plastic birds, fiberglass flowers and extinct U.S. presidents.

Besides the concern for its patented, copyrighted, classified animatronics (which no one could ever afford to duplicate anyway), Disney is also leery of outsiders witnessing the real people and common machinery behind the scenes that perpetuate the fantasy in the public areas. For all practical purposes, even in the PR offices, Mickey is a real mouse, albeit with unusual powers, and those submarines really do dive beneath the North Pole. (My semi-facetious query about whether Mickey Mouse is a scuba diver was met with a frown and the return question, "Have you ever seen a mouse swimming?")

Staff members bandy words like Adventureland and Peter Pan's Flight as naturally as businessmen use bottom line and corporate structure. There is, in fact, such a special language spoken behind those enchanted walls that the standard press kit provides the working

journalist with a lexicon guide and a list of Kingdom nomenclature for reference.

But they are as cooperative as old Pluto directing traffic to the restrooms, and it was soon decided that the *Sport Diver* team — photographer Fred Bavendam and this writer — could follow Tom Fulton on at least part of his rounds on a typical working day. And that we could dive in 20-K. (Tinker Bell, we're living right!)

There followed enough security clearances, clandestine meetings in the wee hours of the day behind the Main Street Silent Cinema, walkie-talkies and car transfers to rival any of the new James Bond movies.

By 6:30 a.m. on a Friday we were at the side of the lagoon looking down at Fulton who was already in the water. His work day had begun about 5 a.m., and would end at 1:30 p.m. with most of the diving being done before park opening time, which is 9 a.m.

Daily he starts out by checking the log in the maintenance building — one of those inner sanctum areas where no one from the outside is ever allowed to go — for any diving duties. Emergencies, wherever they are located, are given top priority; other things fit in when possible. Fulton and the other members of the Fantasyland SWAT team — Richard Boyd, Allan Hall and Darrell Jones — are on call all the time to help out anywhere in the Magic Kingdom.

Today Fulton finds that the pump at the monolith is "acting funny," which will entail a zero-visibility tank dive in four feet of opaque water to remove the faulty recirculation device. This will be followed by an inspection of the four giant intake screens that filter out guest-dropped detritus, ranging from paper cups to diamond rings; cameras to Mickey Mouse ears.

Other days he might be needed to help rewire an elephant's ear in the Amazon, check track switches in Rivers of America, or find a needle in a watery haystack elsewhere.

The pump is not critical, Fulton decides; it can wait. More critical is the need to repair an actuator inside one of the mermaids in 20-K and to exchange one of the life-size harvesting divers in the lagoon for a backup figure.

By 5:45 a.m. he is in his new black farmer john — 90 percent of those corals and rocks are real, with honest-to-goodness sharp edges — which is already turning red from the heavy doses

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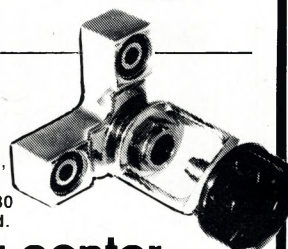
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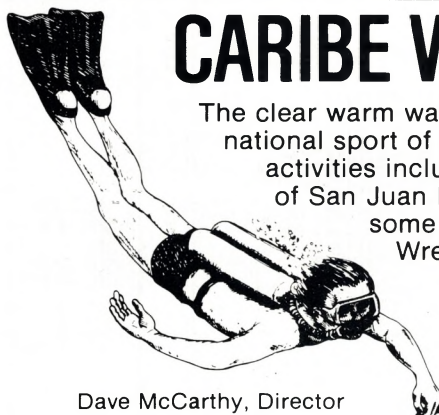


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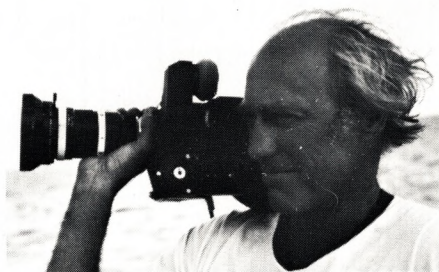
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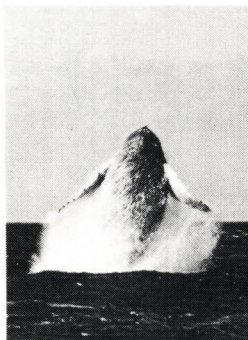


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WORKING DIVER *continued*

of chlorine and anti-algae solutions that keep the water clear. His first task is to head for the submarine bay where the identical Nautilus sleep, to make the daily inspection of the sub bottoms. He checks all 18 of the fat rubber guide wheels that track each of the 38-ton vessels around the narrow confines of the lagoon. These boats are self-propelled with natural gas engines, fully floatable and seaworthy enough to carry them literally to Vulcanis, if only they had auxiliary tanks and rudders.

On this momentous morning (momentous for Bavendam and me, and the anxious PR and security people who have accompanied us), Fulton is pretty damn casual, I think. I, a twittering mass of silliness, fumble fingers and slippery flippers, am the main attraction for the small crowd around the lagoon.

"Prepare to dive! Dive! Dive!" I can almost hear the familiar words of Captain Nemo that start the 20,000 Leagues ride. I flop into the 85-degree water and sneak on my forgotten air valve.

With his small plastic bag of tricks in hand, Fulton swims fiercely for the dark cave wherein lie Atlantis and giant squid. He has little time to work before we must leave the water and, probably, little use for starstruck reporters.

Past octopus wrestling with sharks, huge morays snapping out of their little caves, into the land of eternal darkness where only pale phosphorescence can survive, and under the polar cap, we seem to move faster than the *Nautilus* itself. Straight to the lost continent, with its giant golden carved stone faces (also real), and its scattered treasure troves.

We stop abruptly beside a lovely, if somewhat sexless, mermaid who holds a glittering leash attached to the neck of a cross-eyed seaserpent. Across the submarine track is a mirror image of the scene, as is the case with all the sights in the attraction, so no one on either side of the *Nautilus* will miss anything. And there are those famous toppling columns which appear through the tiny portholes to be but flimsy replicas — with a pair of very real, masculine legs dangling down over the side.

Those flimsy columns weigh over 500 pounds apiece and are strong enough to support not only the entire body of Ross Goodenough, to whom the legs belong, but Bavendam and me.

Goodenough, supervisor of the audio-animatronics department, has just spent the night in 20-K working on a

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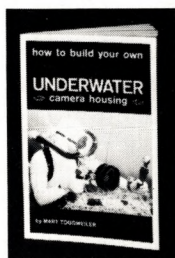
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"mini-rehab" program — a Disney term for complete overhaul of an attraction. He joins us wearily with what air he has left in his third tank of the eight-hour shift. (Average depth here is six feet.)

While Fulton hastily begins the intricate work of replacing the ailing cylinder, Goodenough straddles the broad back of the cockeyed, grinning monster, wipes off a bit of algae and straightens the beast's jeweled collar. I can just hear Nemo roaring in amusement to his first mate: "Mr. Baxter, there are no mermaids and seaserpents ... you've been submerged too long ..."

The mini-rehab, which brought Goodenough to Fantasyland for a temporary, three-month stint, is apparently a godsend for Disney guests. It allows a maintenance crew to bring an attraction up to like-new status without having to shut it down. Previously, before a four-million-dollar filter system was installed, 20-K had to be closed down twice for complete rehabilitation, which took about six weeks, to the dismay of thousands of customers. Since the installation, 20-K has not been closed a single day.

His job done, Fulton rises to the surface where a series of underground catwalks with dim lighting facilitate maintenance work 24 hours a day. He wants to hurry out to the unlit lagoon, which can be worked only during the few daylight hours the park is closed. Instead, he's summoned frantically to Frontierland to find a rudder that has fallen off a Tom Sawyer raft, in six feet of muddy water. ("From Fantasyland to Drearyland," said one wag.) Frontierland's diver is off duty, and Tom is the only one suited up and ready to go.

Opting to stay in 20-K, I swim freely, finding the area even more impressive than it appears from the submarine, despite the maze of wires suspending creatures in mid-water and man-made electric snakes.

Goodenough takes us to the famous giant squid scene where a replica of the replica *Nautilus* — itself a good 15 feet long — lies in the clutches of the monster. "Good Lord! It's one of ours ... it's hull crushed like an egg shell!" I hear Nemo thunder. I can't resist a gentle tussle with the giant tentacles that jangle up and down on either side of the track creating the illusion that a sister squid is attacking the very submarine you are riding on. "Full repellent charge!" I command silently into my regulator.

continued

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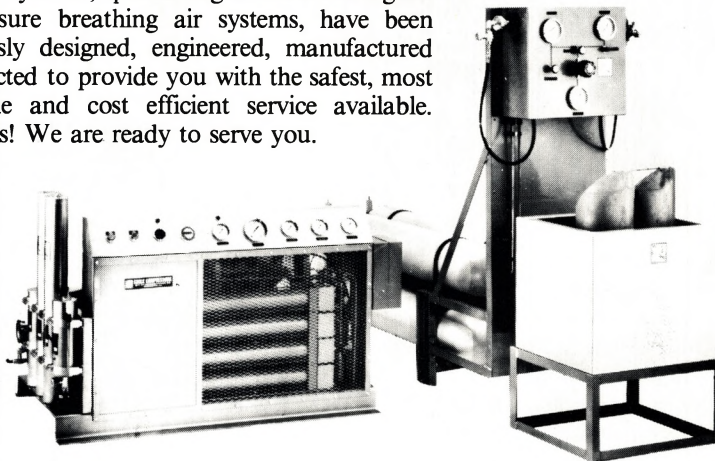
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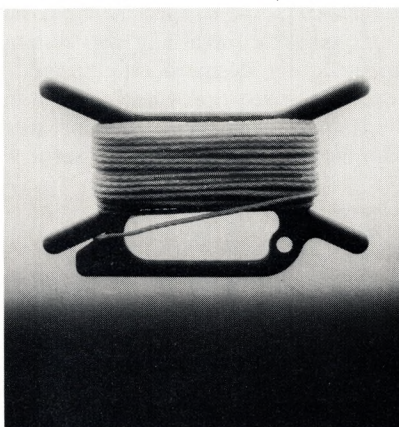
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WORKING DIVER *continued*

Outside the cave, back in the blue lagoon, we sit on the rocks chatting with Goodenough. He talks about the job, and the diving at Disney World.

"It's hard work—young men's work," he says. "One hour under water here, with all the pressure to hurry, constantly going up and down, lifting, carrying 300-pound giant clams around and working with all that expensive, delicate equipment—it's more like five hours on the surface."

"But Fulton and his guys, they like it. It's voluntary, you know."

Fulton does seem to be in the water more than anyone else. Of his 40 working hours each week, he estimates he spends a minimum of ten submerged, diving at least three days, often five.

When the diving is done today, as every day, he will spend most of his time working in the maintenance shop where his skills as a builder are put to many interesting tests. One of the first employees of Disney World, he came to the yet-unopened Kingdom in 1969 as a builder on Cinderella's Castle, the spired structure that dominates the Magic Kingdom. Before that he was a boat builder for 13 years.

"These men are all divers second, and master carpenters, electricians, plumbers and handymen first," says Goodenough. He advises anyone who wants a job as a working diver at Disney World to learn another trade, *very* well, first. "No one is hired because he's a good scuba diver." (Publicity lady Wrenda Goodwyn added, "We're in the entertainment business, and everyone — both on the stage and behind it — is cast' in his or her job.")

Despite the toughness of the job and the vast number of potentially harmful systems they work with, the divers of Disney have had few physical problems, nothing major. "We take a lot of precautions here," says Goodenough. "Three staff doctors are trained to handle all dive-related problems, and we have strict rules—like no diving when you have even the least bit of congestion."

"The biggest problems we have are getting burned on underwater lights," Goodenough added, rubbing a blister on one hand, "cuts from the coral and ear fungus." After every dive the crew must wash out its collective ears with a mixture of vinegar and alcohol; visiting divers are asked to do the same.

Before Fulton returns from his emergency in Frontierland, Bavendam

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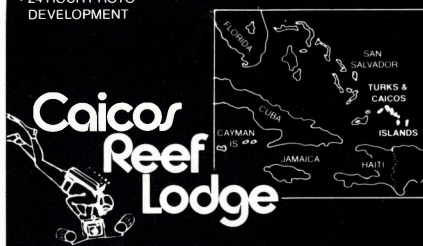
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and I cruise the lagoon, looking at the strange creatures. Two singularly weird ones approach, picking up bits of debris, straightening tufts of seaweed and relocating shells. We all emerge, look each other over suspiciously and ask simultaneously, "Who are you?"

They belong there, for they, too, are working divers, of a different type, at Disney World. Jane Polgard and Tom Rodowsky are members of the four-person animation artist staff that is responsible for all artistic touches in displays, from banjo-playing bears to the kelp beds of 20-K. Under the supervision of animation art supervisor, Paul Strickland, they dive in 20-K about twice a week, replacing chipped figures and generally prettying up the place. Strickland is also responsible for maintaining all working dive gear, from minor leaks to tank hydrostats and regulator overhauls. This equipment bank includes the normal diver gear, except for the heavy-heavy-duty fins, some special underwater drills and jackhammers, and a recent addition, a Farallon DPV to expedite jobs in remote areas.

Fulton finally returns from a successful foray into the murky Rivers of America and heads for the helmeted divers that have been harvesting kelp and corralling sea creatures since the opening of Disney World. A small support boat with block and tackle floats above with the backup figure (all major Disney animated objects have working duplicates in reserve) ready to be lowered for the exchange. Fulton darts to the base of one of the divers, unhooks some wires, lifts the 150-pound figure easily, settles the new one in place, fiddles with some cables and motions to us that he is through diving for the day.

"Red alert!" Security is getting nervous about our being in the water past its 8 a.m. deadline. Everything must be out of the way by the time the paying guests arrive. Nothing must stand as a reminder that those bouncing stingrays are anything but real.

"Prepare to surface! Surface!" Nemo screams frantically. A flurry of bubbles, a last lingering glance at a giant seabass (no "jewfish" in this non-ethnic world), and we rise to the top, to stare the *Nautilus* right in its evil-looking eye.

Ah, but a dream has come true, and I spend the rest of the day following Tom when and where I can, giggling like a toady child after its first encounter with a giant, talking mouse.



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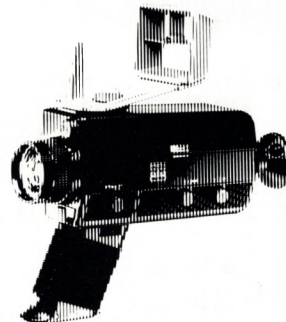
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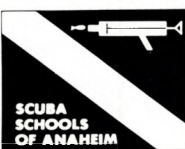


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BY PAUL J. HILL

The word clam means different things to different people. In Scotland, clam means scallop. In other places freshwater mussels may be called clams and the name can be applied to any mollusc that can close its two-piece shell. In the United States, clams are those bivalves that have two adductor muscles. This does not include mussels or pen shells, which can be prepared like clams, or oysters and scallops, which have only one adductor muscle.

Seashores the world over are abundant with clams and many species are used as food. Landlubbers usually have to wait for the lowest tides to dig clams. But anytime is clam time for a diver. There are clams that like quiet estuaries, some like the surf, and still others prefer deep water. All are available to the diver.

Clams bury themselves in sand, mud and even rocks for protection. They

feed by extending their necks, or siphons, up to the water. There are clams that squirt foot-high spouts, clams that bury themselves faster than you can dig, clams that hole up and never move anything but their siphon and clams that bore through rock.

Most clams never move beyond their own square yard of sand. Their whole lives are spent alone, and even sex is a remote control operation.

The razor clams have the edge in any race. They can move through sand faster than you can dig. They're the hares of clam-dom; geoducks (pronounced gooey-ducks) are the tortoises. The geoduck is the largest clam in North America. It prefers sandy mud bays and estuaries, rarely moving except to extend a siphon to the surface.

The largest clam in the world is the *Tridacna*. *Tridacnas* don't have to hide, they lie atop coral reefs in the Pacific and Indian Oceans and can grow to five feet in length and weigh 580 pounds.

The hard-shell quahog ("kwo-hog") and soft-shell clams, or steamers, are popular on the U.S. East Coast. Quahogs

up to two inches long are called cherrystones; from two or four inches they are called littlenecks; and the larger ones are called chowders. Quahogs are found near the surface in the muddy sand of protected areas and inlets and are gathered with a rake. Soft-shells are found ten or more inches below the surface in muddy backwaters of bays and can be dug with a clam hoe or a long narrow shovel with a short handle.

On the Pacific Coast, the razor clam is a favorite and is found about 18 inches below the surface of beaches that receive heavy surf action. Other favorites are the butter clam, littleneck and Pismo clam. Piddocks and angelwings bore into hard clay and even rock. These are the most delicious of all clams and, of course, are the most difficult to dig out. Pismo and surf clams are generally found about five inches under the sand of surf-pounded beaches; they can be dug with a hay fork at low tide.

Pismo clams are found in sandy areas on the Pacific Coast from Central California to Southern Baja. They have been taken from the tidal zone into

*Paul Hill is editor/publisher of PADI's Dive Industry News, and with his wife Mavis, co-author of the book **The Edible Sea**.*

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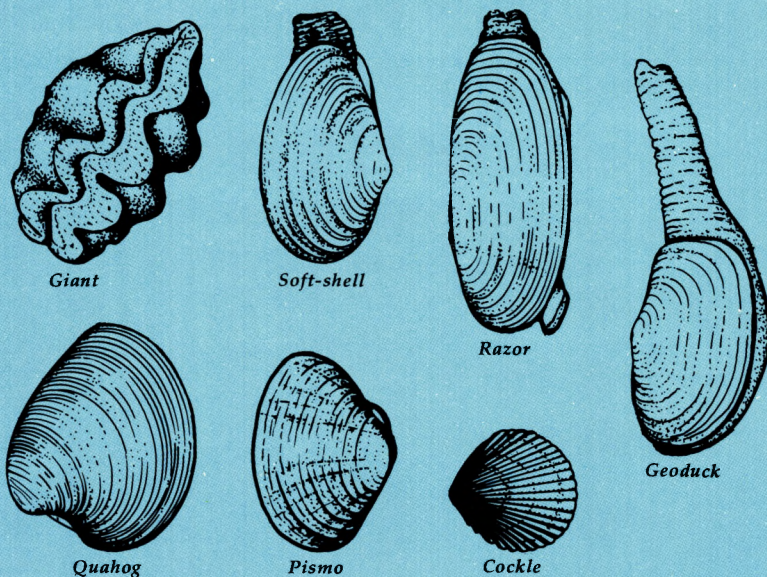
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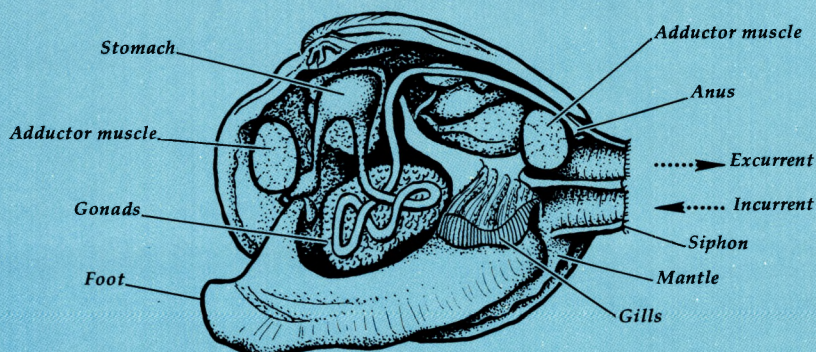
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EDIBLE SEA *continued*

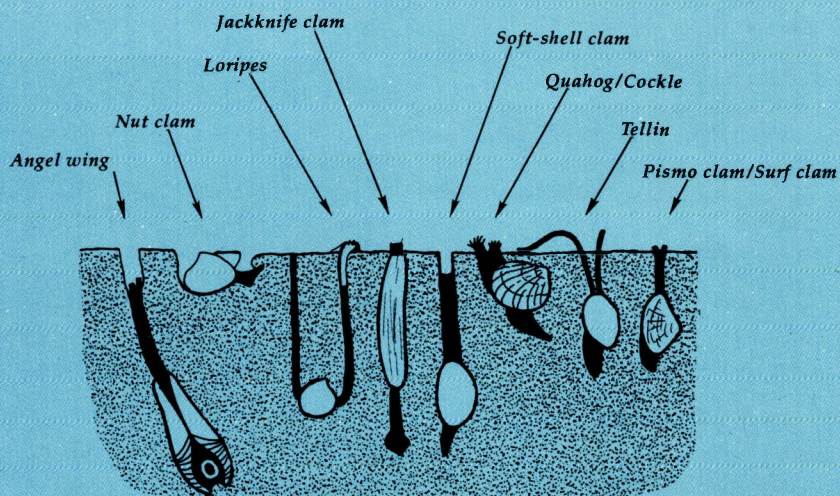
Clams



Anatomy of a Clam



Clam Habitat



water exceeding 80 feet. The offshore variety lives south of Pismo Beach.

Divers in Southern California frequently bring up Pismo clams and prepare clam chowder right on the beach. If you want to dive for Pismos, the offshore clams are out beyond the surf, usually among the sanddollar beds. They are buried at a depth equal to the length of their shells—four to six inches. Normally their two siphons are extended just above the bottom to obtain food and oxygen.

On calm days you can see the siphons. If you see something but aren't sure they're siphons, try tapping gently on the bottom. Watch for a small depression in the sand caused by retraction of the siphons. Dig to about six inches right there and take your clam.

If visibility is near zero, the best way to find clams is to probe the bottom with a knife, screwdriver or heavy rod with a handle. Clams are aligned perpendicular to the beach with hinges toward the open ocean, streamlining themselves to the force of the waves. If you swim parallel to the beach while probing, the clams will be broadside to you. Follow ripples in the sand or use your compass to run a parallel course.

Clam diving does have its drawbacks. Legal-sized Pismos weigh one to two pounds each. The limit in Southern California is four. Without additional buoyancy, you'll have trouble trying to surface. Your buoyancy compensator will probably handle the extra weight, but a small lift bag makes the job easier. The bag shouldn't be attached to you or your equipment so it can be jettisoned if a problem develops.

Much of the same instructions apply to the Atlantic surf clam. It is about the same size and weight as the Pismo and inhabits the same type of terrain.

The Pismo clam, official symbol, mascot and lifeblood of Pismo Beach, California faces a dismal future if controls are not put on the voracious sea otter. The otters, which are protected by federal law, have begun digging out the clams which annually draw thousands of tourists to Pismo Beach, the California Department of Fish and Game said recently. The otters have seriously depleted the clam beds and could wipe them out as soon as 1981.

Nutrition and Health

Clams have an abundance of minerals and are high in calcium. They are about

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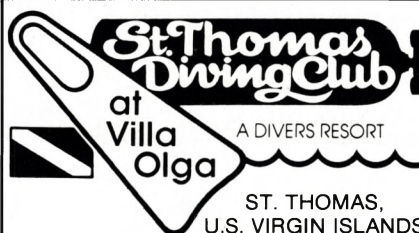


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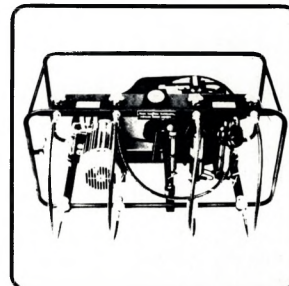
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EDIBLE SEA *continued*

twice as rich in available iron as beef and lamb, and being close to the bottom of the food chain, are an excellent source of high-quality protein. The soft-shell clam and the quahog are among the best natural sources of vitamin B₁₂.

Doctors at the National Institute of Health in Bethesda, Maryland have found that the juices and meat of clams and other molluscs contain a rich source of a substance that destroys some disease germs. Protection against influenza viruses and cold-sore viruses was demonstrated. The mollusc secretions were also shown to have a demonstrable effect on staphylococcus bacteria.

Toxic Clams

Most clams taken in U.S. waters are safe to eat. However, clams taken from water containing untreated sewage are usually toxic. Untreated sewage almost always contains some infectious hepatitis.

Clams which inhabit the open coast or inlets open to the ocean are at times subject to red tide, a micro-organism. Clams infected with red tide can cause paralytic shellfish poisoning. On the Pacific Coast, cases of poisoning have occurred during the summer months, from June to September. It is much harder to predict occurrence of red tide blooms on the East Coast.

The digestive glands of the clam contain the greatest concentration of poison in contaminated clams. The Atlantic surf clam, Pismo clam, gaper, Atlantic and Pacific razor clam, bent-nose, quahog, Washington, smooth and common clam have all been reported to be occasionally toxic. The poison is known to accumulate in the gills of soft-shell and bar clams. The siphons of the butter clam are most often affected.

To avoid poisoning, do not eat the digestive glands (dark viscera), gills or siphons, or drink the juice of clams taken from the open ocean during the summer or when contamination is suspected. Sometimes fisheries officials will quarantine an area in which shellfish poisoning is suspected. Strictly observe any such prohibitions.

Serving and Eating Clams

Small clams, from one-half to one inch long (coquina or wedge) can be used to make broth for chowder and soup. The tiny shells and bits of meat should be strained out after boiling and discarded.

Small hard-shell clams up to two inches (cherry-stone, butter, Washing-

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ton) are tender and best served raw on the half shell or in seafood cocktails.

Medium clams up to three or four inches (littleneck, razor, soft-shell, bent-nose, mud, Washington, butter) are tougher and can be steamed, fried or used in New England-type chowders.

Large hard-shell clams over three inches (quahog, Pismo, surf, angel-wing, piddock, gaper, horse, geoduck) are the toughest and ideally should be ground up for chowders or fritters. Parts of the Pismo can be fried. The body of the geoduck can be fried. The siphon of gaper or horse clams can also be pounded and fried.



Be sure you don't miss the delicious little pink buttons of the larger clams: The two adductor muscles that open and close the clam's shell. These should never be cooked, since even a small amount of heat will render them tough. Raw in salads or as a snack, these muscles are as tender as cheese. Dip them in lemon juice or your favorite sauce.

Purging

Clams should be purged to cleanse them of sand if they are to be steamed or eaten from the shell. Cover the clams with clean sea water or two percent brine water and let stand from two to eight

Digging for clams is a popular pastime for California beach-goers. Of course, this experienced group has brought some special equipment: hip waders and a catch basket. The Ipswich clams they're digging are soft-shells and are delectable steamed.



To open a hard shelled clam, insert a thin, sharp, strong knife into the shell at the thickest end and cut the adductor muscle. Slide around the other end and cut that muscle, then open the clam, catching the juice. After removing the siphon and stomach, they're ready to cook.

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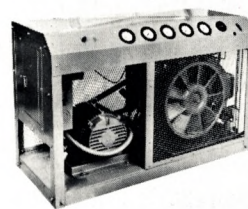
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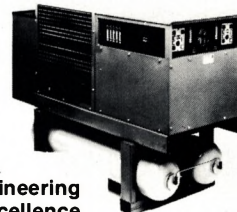
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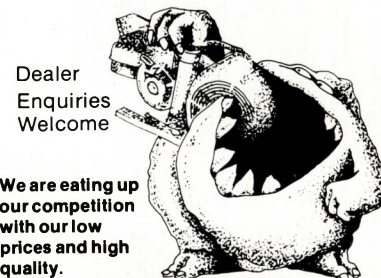
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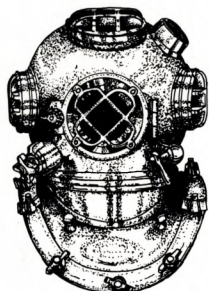
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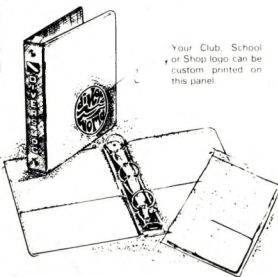
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EDIBLE SEA *continued*

hours, changing the water every 20 to 30 minutes. Large clams, such as Pismo, surf clams, piddocks and angelwings do not need purging. Clams found in muddy areas can be purged by hanging them in a wire mesh bag in sea water for three or four days. Change the water frequently. Soft-shell clams of New England, northern California and Canada should be purged for several days, changing the water two or three times per day. These are the only clams that may be purged in fresh water.

Opening

Open hard-shell clams by inserting a slender, strong knife between the halves of the shell at the thickest end and cut one muscle, then cut the other muscle and open. Catch the juices in a pan as you open the clam. If they are to be served on the half shell, remove only one shell. For other recipes, remove and rinse the meat.

Clams can be steamed open. Place the clams in a large container with a little water and cover with a tight-fitting lid. Bring the water to a boil and steam about five minutes or until the clams open. Be sure to save the nectar left in the pot. Another method is to cover the clams with boiling water and allow to stand for several seconds. Pour off the hot water and cover the clams with cold water. This should cause the clams to pop open. The most practical method is to place the clams in the freezer for an hour or so. As soon as the clam freezes, the muscles relax and the shell opens.

Steamed Clams

Small clams such as steamers, cherry-stones and littlenecks can be steamed. Scrub the clams under running water to remove the sand. Place them in a large kettle with one-half inch of water or white wine. Cover tightly and simmer for five to ten minutes, or until most of the clams are open. Serve hot in the shell with side dishes of hot clam broth and melted butter. Dip clams in broth, then butter and enjoy.

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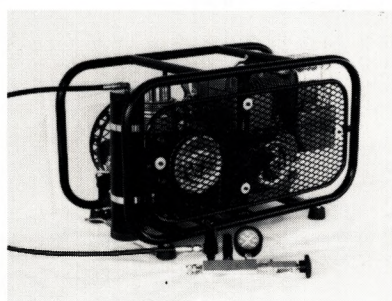
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cocktail sauce in the center. Garnish with lemon wedges. Serves six.

Ipswich Fried Clams

1 quart clams, shelled and drained.
1 egg, beaten with:
1 tablespoon milk,
1 teaspoon salt,
1 cup even dry bread crumbs.
Dash of pepper.

Cut off dark neck of soft-shell clams. Dip in egg mixture and roll in bread crumbs, coating evenly. Fry in basket in deep fat at 375 degrees for three minutes or until golden brown. Drain on paper towel and salt lightly. Serves six.

Pismo Clam Chowder

8 Pismo clams;
1 pound potatoes, diced;
1 pound chopped onions;
1/4 pound bacon cut in 1/2-inch squares;
1 cup frozen whole kernel corn;
Clam juice from cleaned clams;
1 pint Half 'n' Half;
1/4 pound butter.

Clean and grind clams in meat grinder. Sauté onions in a pat of butter. Drain and place with the potatoes in a large kettle with just enough sea water or salt water (one teaspoon salt per cup of water) to cover. Fry bacon until crisp and add to the kettle, then add corn. Brown about half the ground clam meat in the bacon fat, then add this along with the raw clam meat to the chowder. Add the clam juice and cook for 20 minutes. Now add the Half 'n' Half and cube of butter. Heat until the butter is melted and serve with crackers or French bread.

Manhattan Clam Chowder

Just about any combination of clams, butter, onions, potatoes, bacon or salt pork and milk will produce a chowder. This is one of my favorites.

1/4 pound diced salt pork;
1 large onion, chopped;
4 large potatoes, diced;
1/2 cube butter;
salt to taste;
Clam juice;
1 pint clam meat, ground;
1 pint milk.

Fry salt pork until brown. Drain off all but three tablespoons of fat, add onions and sauté until transparent. Add potatoes, butter, salt and clam juice with enough water to cover. Bring to a boil, then simmer covered until potatoes are done. Add clams and milk, reheat without boiling. Serve hot with crackers. ☺

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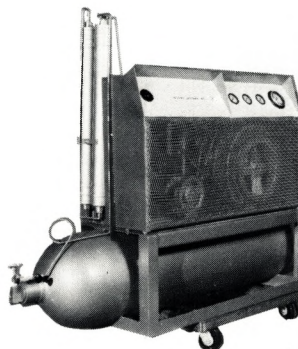
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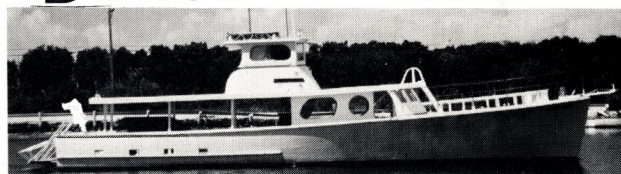
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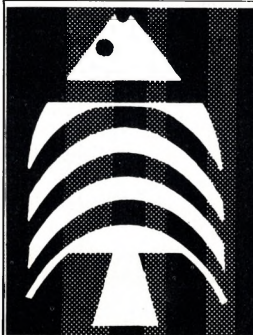
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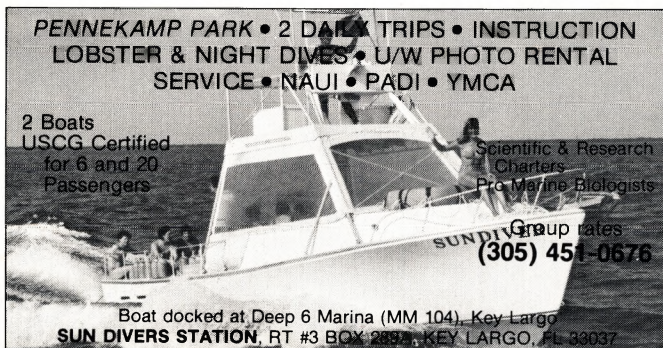
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Trips

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PROFESSIONAL DIVING SCHOOLS OF FLA. WANTS YOU TO MAKE A DIVE WITH "EXPERIENCE"

We offer the
finest charters on
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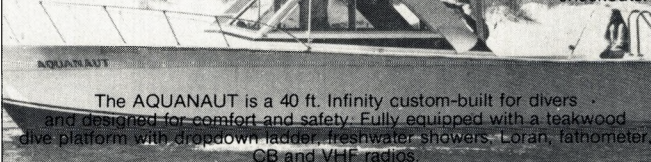
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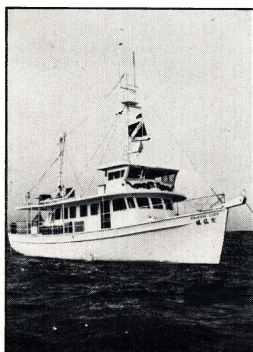
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2 days/1 night (5 dives)	\$165
3 days/2 nights (8 dives)	225
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5 days/4 nights (14 dives)	335
6 days/5 nights (17 dives)	390
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Inform divers about where you cruise, what types of diving are available, accommodations offered on your vessel and how to book charters.

For more information on this section write or call:

Jonathan Blumenfeld
SPORT DIVER Magazine
444 Brickell Ave., Suite 250
Miami, FL 33131
(305) 358-0100

Norman Hamilton
SPORT DIVER Magazine
444 Brickell Ave., Suite 251
Miami, FL 33131
(305) 358-0517

RESORT GUIDE U.S. VIRGIN ISLANDS

BOLONGO BAY BEACH & TENNIS CLUB/ OCEAN ADVENTURES— ST. THOMAS, U.S. VIRGIN ISLANDS

P.O. Box 7337, St. Thomas, USVI 00801. (809) 775-1800

RESERVATIONS: Bolongo Bay Beach & Tennis Club c/o Dick Doumeng, P.O. Box 7337, St. Thomas, USVI 00801. (809) 775-1800 or toll free (800) 223-5695 (except NY (212) 730-8100).

LOCATION—Club is situated on 10 acres of property on southeast side of island on beach. 3 miles from downtown and 10 minutes from airport.

TRANSPORTATION—Air: Air Florida, American, Delta, Eastern from Miami. Charters: several airlines available from San Juan. Ground: taxi from airport \$4.50, major car rentals at airport.

ACCOMMODATIONS—Thirty-seven room deluxe resort with 800' of private beach. Rooms are all air conditioned with private bath, fresh-water shower, some with kitchen facilities, balcony and radios. Resort has four tennis courts, pier, dive store and freshwater pool. Restaurant, lounge/bar with nightly entertainment. Rates: single \$48, double \$52, summer, \$84 winter. Major credit cards accepted.

DIVING AVAILABLE—

Shallow reef (5'-33') **yes**
Mid reef (33'-66') **yes**
Deep reef (66'-99') **yes**

Walls **no**
Wrecks **yes**
Caverns **yes**

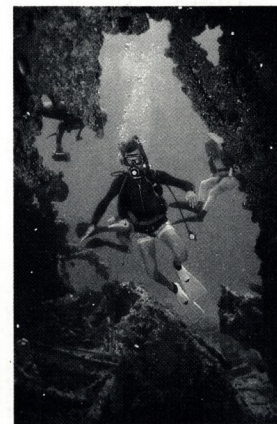
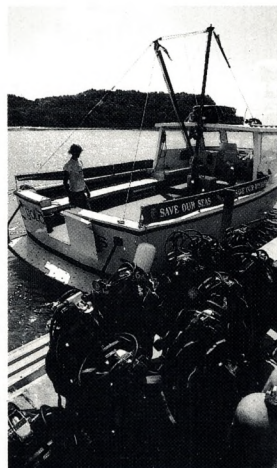
Drift dives **no**
Night dives **yes**
Beach dives **yes**

DIVING EQUIPMENT—2 Worthington compressors, 3000 PSI. 80-72 cu. ft. tanks. 2 boats include new Lindsey 43' and Dusky 32' with total diver capacity of 38. Full service retail sales and complete line of rental gear. Tank, bac pac, weight belt, regulator, BC, mask/snorkel and fins included in dive rate. U/W camera \$25/day.

DIVING SERVICES—NAUI, PADI affiliation. 4 instructors and 2 dive-masters with CPR training. Resort course \$25, full certification \$175, advanced training \$75-300, U/W photo, bottle hunting and specialty courses available. Cost/half day diving \$25 for 2 tanks, full day diving \$50 for 3 tanks, night dive \$35 beach, \$40 boat.

DIVING PACKAGES—Special package price available through St. Thomas Diving Club. Includes accommodations, 18 dives, airport transfers, equipment (based on double occupancy).

bolongo bay
BEACH AND TENNIS CLUB



Wreck of the Rhone
1867 The site for the filming of the movie "The Deep" Photo Armando Jenik

SPANISH BAY REEF RESORT— NORTHWEST, GRAND CAYMAN ISLAND

P.O. Box 800, Grand Cayman, B.W.I. Phone: 93765.

RESERVATIONS: Spanish Bay Reef Resort, P.O. Box 3271A, Birmingham, AL 35205. Phone: (205) 933-0907. Or Spanish Bay Reef Resort, P.O. Box 800, Grand Cayman, B.W.I. Phone overseas operator: 9-3765. Telex: 203 SBRRSCP.

TRANSPORTATION—Air: Cayman Airways, LACSA, Southern from Miami, Red Carpet Air from St. Petersburg/Clearwater. Ground: taxi from airport \$12 (a local ordinance forbids Grand Cayman resorts to pick up guests at airport), courtesy return ride to airport, car rentals available at resort.

ACCOMMODATIONS—Twenty-five private bungalows by the ocean, each spacious with its own cathedral ceiling, individual deck, and luxurious furnishings. Air conditioning is available, ceiling fans throughout. Main building is two stories and houses dining room and bar. Dining room has 100 capacity, oceanfront view, unique menu. Bar and lounge are on second level overlooking the ocean. With wall to wall circular saltwater aquarium. Lounge has complete audio visual equipment for weekly movies and slides. Complimentary hors d'oeuvres in lounge after night dives. Balcony overlooks patio, barbecue and pool. Rates: Complete range of accommodations run from single to triple with either FAP, MAP or EP. Price list available on request from reservations address. 15% gratuity and 5% room tax extra. American Express, Visa and Master Charge accepted.

DIVING AVAILABLE—

Shallow reef **yes**
Mid reef **yes**
Deep reef **yes**

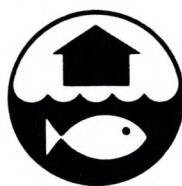
Walls **yes**
Wrecks **yes**
Caverns **yes**

Drift dives **no**
Night dives **yes**
Beach dives **yes**

DIVING EQUIPMENT—Worthington and Mako compressors, 3500 PSI. 100 tanks 72 cu./ft. 3 dive boats include two 34' Bristol flattops powered by twin Evinrude 175 outboards. Flattops have individual seating, gear storage, sunroof and center tank racks. Each vessel carries crew of 3 that includes captain, mate and divemaster. All boats are linked to resort with VHF radio. Total diver capacity of 60. No retail sales. Complete line of rental gear includes mask, fins, snorkel, tank, bac pac, regulator with gauge, buoyancy compensator, weight belt, U/W light, depth gauge, U/W timer and U/W camera. Write for rental rates. Camera repair, film and 24 hr. processing available.

DIVING SERVICES—PADI, NAUI, NASDS, SSI, YMCA affiliation. Three instructors and two divemasters who are CPR first aid trained. Staff undergoes constant in-service training for safety. Resort course, full certification course, U/W photography course, U/W Marine Biology course available. Half day diving (1 tank), full day diving (2 tanks), night dive are daily scheduled dives. Write or call for complete details and price list. Tank, bac pac, wt. belt included in rates. Dives are preplanned for maximum time underwater, complete briefing before dive to determine individual skill level and desires. Dive sites are short boat rides from dock.

DIVING PACKAGES—7 days/6 nights package available for either diver or non-diver in single or double accommodations. Includes six days with two tank dives, accommodations, availability of all hotel facilities including isolated sand beach, freshwater swimming pool and scheduled underwater film and slide shows. Gratuity on rooms, meals and diving is included. 5% government room tax also included as well as return transfer to airport. Special group diving package available to groups of 15 or more. Features include accommodations for 50 divers (double occupancy), exclusive use of dive boat with experienced captain and crew plus divemaster, exclusive use of air conditioned classroom with visual aid equipment and recording apparatus, exclusive use of photo darkroom and processing laboratory, semi-private seating area in dining room, Rum Punch Welcome Party with staff introduction and general orientation, availability of telephone and Telex communications plus local transportation. Special program include U/W photography courses with Jim and Cathy Church, Tropical Reef Biology course, U/W Archaeology seminars. A minimum deposit of \$200 per person is required at the time of the booking to hold the reservation. The balance is to be paid in full 30 days prior to the arrival date. Individuals cancelling 30 days or less prior to arrival will forfeit 50% of their deposit. The cancellation charge will be waived if accommodations are resold.

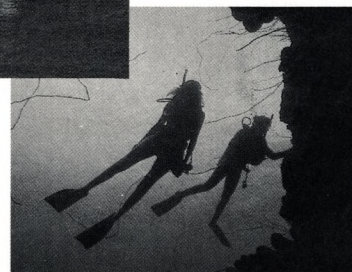
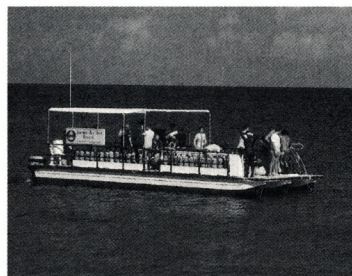


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THE OUSTANDING RESORT
FOR DIVERS IN THE CAYMAN ISLANDS



ABOVE OR BELOW
THE WATER
SPANISH BAY REEF
HAS MORE TO OFFER





PRO DIVE STORE DIRECTORY

The Pro Dive stores below are listed by state, then alphabetically by cities and store name within each city. To advertise your professional services in the directory, send \$110 (6 issues) check or money order, with listing information to Pro Dive Store Directory % Norman Hamilton, 444 Brickell Ave., Suite 250, Miami, Florida 33131. Pre-payment will expedite materials and assure your listing. Tell divers where you are, what you offer, and that you want to do business with them—list your facilities in the Pro Dive Store Directory.

ALASKA

Alaska Aquatic Dive Center

NASDS Inst.-Full Svc. Scubapro Shop-Air-Rentals-2 man chamber-Hydro 7 Tumble-Boat Trips-Catalog SIs-C card required. 503 Water St. Ketchikan, Alaska 99901 (907) 225-5020, 225-DEEP

ARIZONA

Scuba Sciences, Inc.

Arizona's most active dive Center-NASDS 8502 N. Black Canyon Hwy., PHX, AZ 85021 (602) 995-5926 or (602) 946-1620 1833 N. Scottsdale Rd., Tempe, AZ 85281

ARKANSAS

Scuba Hut-Sportsco

Custom Screening & Transfers-Shirts-Instruction-Air-Rental-Boats 1115 S. Hwy. 71, Springdale, AR 72764 (501) 751-0636

CALIFORNIA

California Skin Diving School

1083 N. Harbor Blvd., Anaheim, CA 92801 (714) 991-DIVE; 9762 Magnolia, Riverside, CA 92503 (714) 689-2422; 1173 N.E. St., San Bernadino, CA 92410 (714) 885-1416; 4420 Holt Blvd., Montclair, CA 91763

Scuba Schools of Anaheim/Long Beach

Oceanside Classes-Equipment Sales-Repair-Rental. 1640 W. Lincoln, Anaheim 92801; (714) 956-5540; 4740 P/C Hwy., Long Beach 90804; (213) 433-6765; 129 South Hill, Oceanside 92054; (714) 722-2455

Aqua-Ventures Diving School

PADI 5 Star training facility. All major brands. Complete professional in-house repair. Tour Channel Islands. Open 7 days. 3000 psi-Sales-Rentals-U/W Photography. 2172 Pickwick Drive, Camarillo, CA 93010 (805) 484-1594

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Divers Corner

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Laguna Sea Sports

925 N. Coast Hwy., Laguna Beach (714) 494-6965; 1951 Newport Blvd., Costa Mesa (714) 645-5820; 7066 Van Nuys Blvd., Van Nuys (213) 787-7066; 18503 Hawthorne Blvd., Torrance (213) 542-8609; 3335 Motor Ave., W. Los Angeles (213) 559-7771

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Aquarius Monterey

Vacation beautiful Monterey, CA; Giant compressor-Rentals-Much Equipment. Call for info or conditions. 2240 Del Monte Ave., Monterey, CA 93940 (408) 375-1933

Newport Pro Watersports

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Divers Down—San Fernando Valley

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Scuba Duba Dive

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Wallin Dive Store

U/W Photo Specialists-Instruction-Rentals-Air-Repairs-Travel-Marine Art-Books-Jewelry 1656/58 El Camino Real, San Carlos, CA 94070 (415) 592-7606

The Underwater Experience, Inc.

Gateway to Channel Islands Diving-Sales-Rentals-Inst.-Air-Charter boat dives. 824 Thousand Oaks Blvd., Thousand Oaks, CA 91360 (213) 991-4151; (805) 497-0855

COLORADO

Odyssey Diving Center

2680 S. Havana, Aurora, CO 80014, Alan Cunningham, (303) 751-4991

CONNECTICUT

Orbit Marine Sports Center

NAUI-PADI Instruction-Sales-Rentals-Air Trips-Hydro-Visual Insp. 3273 Fairfield Ave. (203) 333-DIVE

The Diving Bell

Sales-Rentals-Repairs-Air-Hydrotest-Open all year-Certified Instruction. Dive Lake Candlewood. Rt #7, Rd. 5, Brookfield, CT 06804. (203) 775-3573

Aqua Sports, Inc.

Air Station-Instruction-Service-Tank Testing & Cleaning-Salvage-Repairs. Victor G. Worst & Phyllis C. Tetrault, Rt. 12 & Long Cove Rd., Gales Ferry, CT 06335. (203) 464-7878

Will Jacobs Dive Shop

Sales-Service-Rentals-Hydro-Instruction. 1153 New Britain Ave. W., Hartford, CT 06110. (203) 232-8719.

Jack's Dive Center

Sales-Service-Instruction-Rentals-5000 psi Air-Trips-Photography & Commercial Equip-AGA Divator. Rt. 10, Plainville, CT 06062 (203) 747-3170

The Scuba Shoppe/Recreation Unlimited

Cross Country Alpine Skiing. Full service dive shop-Scuba lessons-All levels of certification. Foot of Broad St., Stratford Marina, Stratford, CT 06497. (203) 377-6969

FLORIDA

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Nautilus Dive, Surf & Ski

Open 7 days a week. Rentals-Air-Instruction-Trips-Repairs. 877 E. Palmetto Park Rd., Boca Raton, FL 33432. (305) 368-0555

eFlorida Divers Service, Inc.

Dive boat Bottoms Up-Reef trips-Air-Pro Shop. 2280 N. Fed. Hwy., Boynton Beach, FL 33435 (305) 737-7240

Gulfview Divers Headquarters

Air-Rentals-Sales-1 week Scuba Course-Pool on premises-Dive trips-PADI Inst. 101 Bridge St. Bradenton Beach, FL 33510. (813) 778-3735

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2105 Ponce de Leon Blvd. Coral Gables, FL 33134. Nikonos-Subsea-Ikelite-Sunpak Marine-Pentax. Dealer inquiries invited. FL WATS (800) 432-2384. Your U/W Photo Equipment Specialist.

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Sales-Service-Rentals-Lessons-Air 861 S.E. Tamiami Trail, Charlotte Harbor, FL 33950. (813) 629-2722

Manatee Headquarters

Talley's Pro Dive, CMAS, PADI, IDEA-Tours-Boat Rentals-Equip. Repair-Dive shop-Instructor rates. 251 NW 3 St., Crystal River, FL 32629. (904) 795-2776

Herb's Dive Shop

Reef Trips-Scuba Tours 2434 S. Atlantic Ave., Daytona Bch., FL 32018 (904) 253-7221

Professional Diving Schools of Florida

Daily diving trips and private charters-PADI 210 N. Federal Hwy., Deerfield, FL 1540 N. Federal Hwy., Pompano, FL. Bahia Mar Yachting Center, Ft. Lauderdale, FL. Call (305) 761-3414

Divers Haven

Sales-Instruction-Service-NASDS instruction
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1530 Cordova Rd., Ft. Lauderdale, FL 33316
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(305) 491-7723

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1717 South US1, Ft. Pierce, FL 33450.
(305) 461-4488

Allen's Aquatic & Trail Center

Sales-Service-Inst.-Air-Scubapro-Dacor-U.S.
Divers-Farallon-Ikelite-Bayley.
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(904) 373-9233

Tarpoon Diving Center-Kevorkian, Inc.

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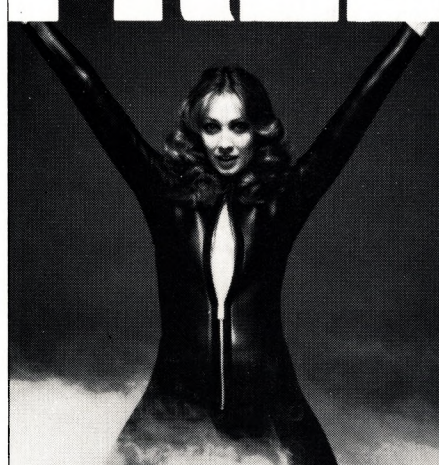
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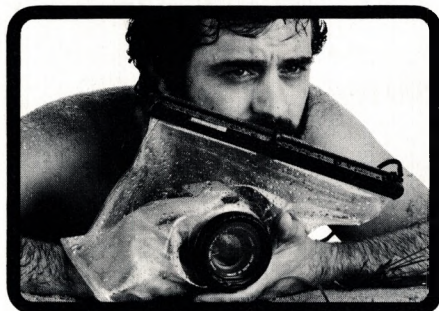
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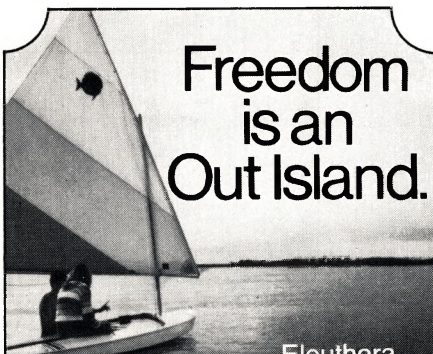
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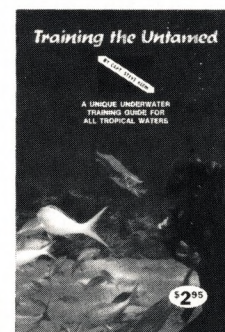
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REVIEWS



Training the Untamed

Capt. Steve Klem; Des Plaines Publishing Co; Softbound; 57 pages; \$2.95.

Wow-ee! Golly gee! Look at me! I'm feeding untamed fish on a coral reef. Underwater guide Klem narrates in his homey style the trials and tribulations of hand-feeding angels, hogfish, grouper, rock beauties, a shy moray eel and various tropicals of Pennekamp State Park off Key Largo. You've got to admire his patience. To capture the successful moments, he and cameraman Jim Doran spent weeks, or probably months on the bottom, baiting and waiting for the fish to bite. Doran's shots are sometimes fuzzy and out of focus and only eight appear in color, but the shots of Klem feeding by mouth a barracuda he nicknamed "Mr. Polack," redeem him.

Capt. Klem cautions that his booklet should not be used as a course of instruction, simply a narrative of his feeding adventures. There's no actual training here (as we know fiery hoops don't fare well underwater) but there are helpful hints on bait (oatmeal, mullet, ballyhoo); the best subjects (angel, damsel and grouper); and special cautions (don't make any sudden moves when feeding the 'cud by mouth). Capt. Klem concludes with a special appeal for the conservation of "this priceless piece of submerged real estate. We all must prevent its wanton destruction."



Divers and Cameras

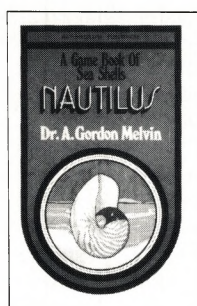
Joe Strykowski; Dacor Corp.; Hardbound; 212 pages; \$6.95.

Photography is not an exact science and neither is diving. So when the two are merged, there are many gray areas that can

confuse and frustrate the novice subsea photographer.

Underwater veteran Joe Strykowski, producer-host of the TV series "Man and Sea," has defined some of those fine areas and cleared up the backscatter of confusion involved in the effects of water on light, film subject, perception, lenses, focal planes, meters and more. Besides the physical adjustments to buoyancy, salinity, temperature, pressure and sound, the underwater photographer must make mental adjustments for field of vision, absorption of color, color temperature, apparent distance and unusual lighting conditions to name a few. Strykowski guides the neophyte through the rigors of this exciting sport with suggestions, hints and plain good advice, culled from years of trial and error.

He tells what to expect in the way of difficulties and the best way he's found to handle it, how to build your own housing, the best film for particular situations, and a few tricks he's devised (for example, a 55-minute tape recording narrating the 13-step routine of processing color photos). He also covers the elements of composition, harmony, proportion, balance, shapes and moods of a photograph. For the advanced student, there's advice for underwater movie-making, action, planning, narration, equipment, sound effects and music. Although not explained in detail, the chapter gives the basics for creating your own underwater masterpiece. Ernie Duerksen's artful cartoons and illustrations animate the copy, and all that's missing is a glossary of photographic terms.



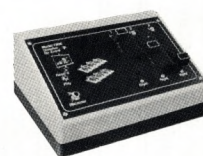
Nautilus:
A Game Book
of Sea Shells

Dr. A. Gordon Melvin; Naturegraph;
Softbound; 32 pages; \$3.50.

If you're planning to read this book — forget it. It may look like a book, but it's a seashell game, disguised as a book. Just punch out the 56 cards, each depicting a different shell, grouped in families and learn while you play Shell Collector, Scientific Shell Collector, Nautilus, Guess Which Shell or Give Away A Shell. The various games devised by Dr. Melvin are explained on the opening set of cards and they range in difficulty from child to adult. Each card lists the shell's name, Latin variation, location and related shells. It may not make good reading — but it's fun and you may learn something. ☺

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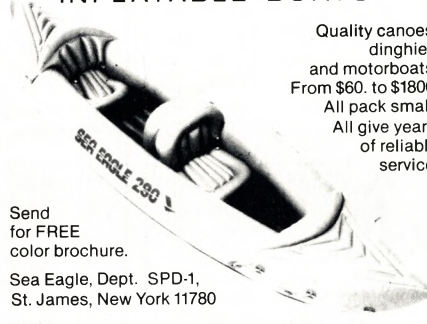
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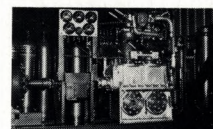
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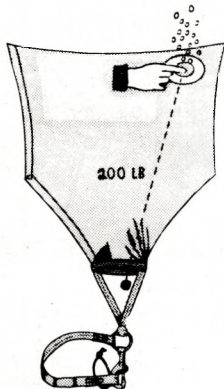
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CALENDAR

January

12-20 Medicine in Depth

The Flamingo Beach Hotel in Bonaire, Netherlands Antilles will host Human Underwater Biology's post-graduate medical education program for physicians. The course will acquaint diving doctors with physics, physiology, characteristics and danger of the underwater environment, pathophysiology of diving casualties and emergency transportation of stricken divers to recompression facilities. Attendees will tour the hyperbaric chamber on Curacao and have a chance to dive or be certified. Contact: Program Coordinator, Dept. 1264, Human Underwater Biology, Box 5893, San Antonio, TX 78201.

12-13, 26-27, Feb 9-10

NACD Instructors Institute

The National Association of Cave Divers will hold an instructor training institute for interested members in the Branford-North Florida area. Course director is Lewis Henkel. Write NACD, Box 13226, Orlando, FL 32952.

19-22 DEMA Trade Show

New Orleans's Marriott Hotel is the headquarters for the 1980 Diving Equipment Manufacturers Association annual trade show. More than twice the floor space of the 1979 show should provide more booths for more exhibitors and more attendees than ever. Every major scuba and wetsuit equipment manufacturer in the U.S. will exhibit along with travel agents, camera and photographic firms, certifying agencies and boat manufacturers. Foreign attendance is also expected to increase. DEMA has invited clothing and swimwear manufacturers to the show, in response to the 1979 Trade Show Survey. Seminars for the retailer will cover everything from advertising to sales help.

A cocktail party on Saturday night will honor persons who have made outstanding contributions to diving. For information on the show, write: DEMA, Box 4067, Irvine, CA 92716.

1980 Sport Diver U/W Photo Contest

Entries are now being accepted for our annual photo competition in eight categories: saltwater color and b/w, freshwater color and b/w, fixed-focus color and b/w, creative photography and fresh or saltwater movies. Deadline for entries is August 16, 1980. Winning photos will be published in the Jan/Feb 1981 issue. Send entries to: U/W Photography Contest, Sport Diver Magazine, 444 Brickell Ave., Suite 250, Miami, FL 33131.

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*Complete description and procedures for TRI test equipment are in the current June 1978, U.S. Navy Diving Manual, Vol. 1, Diver's Air Sampling, Appendix M.

February

9 Fluid Visions

PADI's Underwater Photographic Expo features seminars and workshops covering various underwater photography techniques: housings, developing, strobe lighting, camera insurance, packing and selling photos. Dick Anderson will emcee the evening film program which will highlight the winners of the PADI Underwater Photography Search Competition. The event will conclude with a Diver's Disco Party. For ticket and program information, write: Fluid Visions, PADI Headquarters, 2064 N. Bush St., Santa Ana, CA 92706.

11-15 Scuba Search & Recovery

The National YMCA Underwater Activities Center in Key West, FL will offer fire, police and rescue personnel who are certified divers a chance to learn advanced rescue techniques. Procedures to be covered include planning, hazards, search patterns, rigging and light salvage, lifesaving, linehandling, use of recovery equipment, boats and special search problems. Cost of the program is \$140. Register by Feb. 4; send \$60 deposit to: National YMCA Underwater Activities Center, Box 1547, Key West, FL 33040.

16-24 Dive-Med U/W Medicine Program

This seven-day program will review diving emergencies and routine medical problems which face the physician at a Caribbean scuba resort. Emphasis on a review of marine biology will be discussed by Dr. Bruce Chalker of Auburn. In addition, the current diagnosis and emergency treatment of ENT trauma, decompression sickness, air embolism, drowning, shallow water blackout and exposure will be reviewed. The Undersea Medical Society, Inc. has approved the academic portion of this course for 20 AMA Continuing Medical Education credits, Category I. Course director is Dr. Edward Tucker. Write: Dive-Med International, The Gruhn Bldg., 3001 S. Hanover St., Baltimore, MD 21225.

March

23-Mar 2 PUMP-Bonaire

The Physicians Underwater Medicine Program will take its course to Bonaire in the Netherlands Antilles for a week of diving medicine seminars. Contact PUMP, Box 530344, Miami, FL 33153.

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I Learned About Diving From That

In some ways, diving with sharks in open water is an ideal learning situation.

BY MARTY SNYDERMAN

The shark, a seven-foot-long blue, approached Steve Earley and Howard Hall from behind and above. I knew neither diver saw the shark but I was not concerned, because that particular blue did not appear to be anymore aroused than the rest of the 20 or 30 sharks swimming in the iridescent blue water of the California Pacific. Suddenly, with a burst of speed so rapid I couldn't follow the action, the blue made a run at Steve. The next thing I remember seeing was Steve's head inside the shark's mouth and the shark thrashing violently. I vividly recall seeing Steve's mask flood and his regulator being knocked out of his mouth. I felt an icy chill of horror throughout my body.

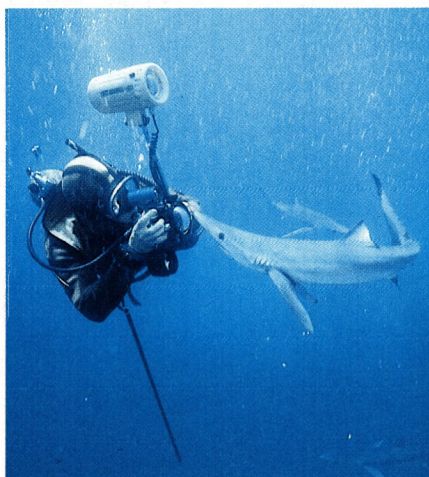
This scene was not the creation of a Hollywood director and I was not in a movie theater. As a matter of cold hard fact, I was in the open ocean about 60 miles off the coast of San Diego and Steve Earley, a very close friend of mine, was indeed being attacked by a heavy-set blue shark. Howard Hall, Larry Cochrane and I had shared the dream of filming the pelagic sharks of Southern California for several years and at that moment our dream was turning into a real life nightmare.

Along with Fred Fischer and Clarece Prange, we were working under the direction of Stan Waterman, helping Stan film California sharks for a prime-time television documentary. As we had for the previous two weeks, we baited the sharks in by creating a slick with fish scraps, and when 20 or 30 sharks gathered around the boat we entered the water to film their behavior.

In many respects, diving in shark-filled waters in mid-ocean is an ideal learning situation. No matter how many dives I have made under similar circumstances, I am always giving the dive my

undivided attention. I have experienced emotions ranging from total exhilaration to raw fear but I believe that I am always totally in touch with my thought processes. While the idea of diving in an open-ocean chum line with sharks everywhere in sight might sound extremely dangerous, it is equally true that Steve, Larry, Howard and I had done so for hundreds of hours without anyone being bitten.

As I think back about Steve's misfortune I feel a pang of guilt as I realize



that all of us had become a bit over confident and had come to take the generally docile nature of blue sharks for granted. We simply learned to believe that blues prefer the taste of fish to that of neoprene rubber or human flesh. Many experienced divers consider blue sharks to be no real threat, but as I know all too well, no matter what their usual behavior, they will attack divers under the right circumstances.

Steve's experience taught me that in open-ocean diving the human head is more susceptible to being bitten than other body parts. Scuba divers often keep their heads quite still in their efforts to maintain equilibrium and orientation in the dizzying conditions of mid-water diving. The head becomes an ideal target as it is just the right size and

shape for a curious shark to bite, and biting is one way that sharks explore their environment. Wearing a standard diving hood may offer some protection against a nip from an unseen shark. A hood certainly is not much protection against a full-fledged bite. Making sure to look above and behind you every few seconds is an excellent precautionary measure.

Steve was trying to fend off the shark as I yelled through my regulator at Larry and Howard. I started out of the cage to go to Steve's aid but I knew it would take me too long to get there. Larry saw me and turned to help Steve. Later, Larry told me that the first thing he saw was Steve's head looking "elongated and much flatter than usual" and Steve's body "being shaken like a ragdoll." Howard, realizing that something was wrong, saw Steve and immediately swam to help him. Howard grabbed and hit the blue several times. The shark swam away.

As the shark swam off, Steve, much calmer than the rest of us, replaced his regulator, cleared his mask, and straightened his hood. He then calmly began to tend light cable for Howard once again. The rest of us decided to abort the dive and regroup topside.

As just plain good luck would have it, the blue shark ended up with more of Steve's hood than his head. While Steve's head was cut on both sides and he said he felt his head was being crushed by the pressure, he did not require stitches. His hood contained the perforated imprint of a blue shark's jaws and teeth, and our collective psyche had received quite a jolt.

Since that fateful dive Howard, Larry and I often tease Steve about losing 20 or 30 IQ points to the stomach of a blue shark. There is usually a little nervous laughter and then a pause — as we gently caress our own heads and think about what we learned from Steve Earley's experience with a blue shark. ☺

Marty Snyderman is a West Coast photographer and writer who is a regular contributor to Sport Diver.



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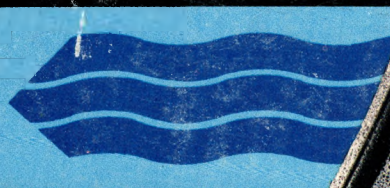
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